

let's look at...

MCGREGOR

INSECTS



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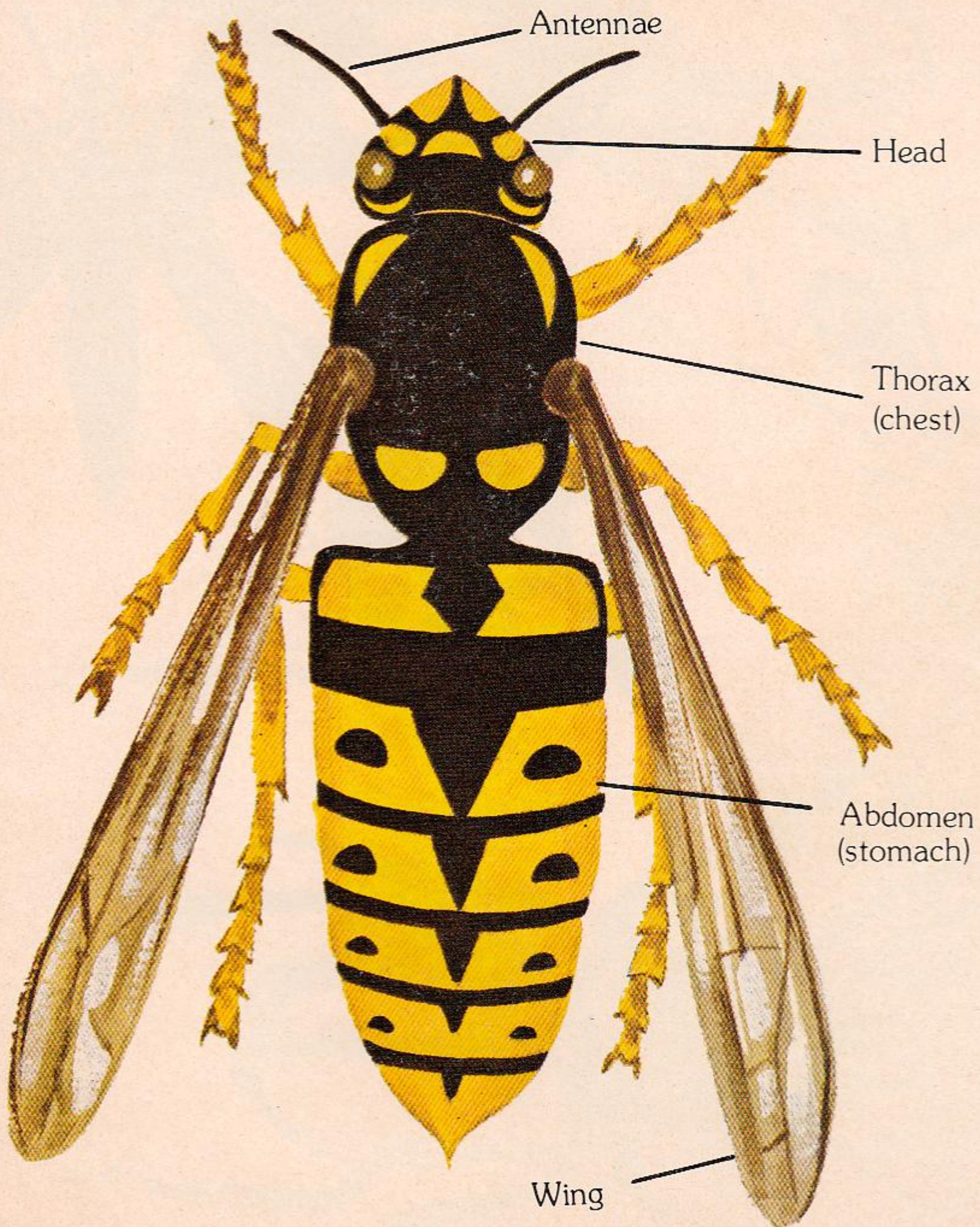
A PROJECT BOOK

ILLUSTRATED BY ERNEST PAPPS

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WHAT IS AN INSECT?

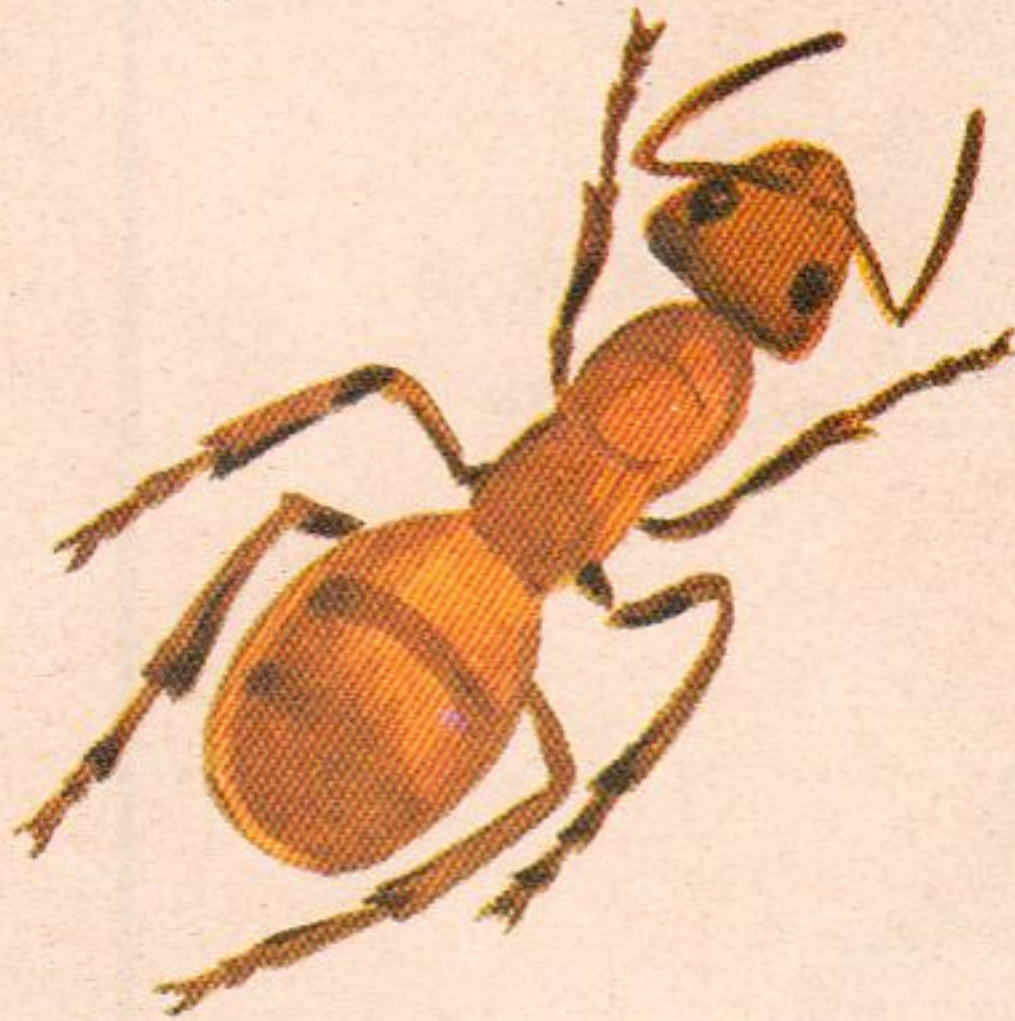
True insects when adult, can be distinguished by the basic body structure, being in three parts. They have three pairs of legs. Many of them have either one pair or two pairs of wings. On their heads, they have a pair of antennae or feelers.



The many different types of insects.
All have the same basic body structure.



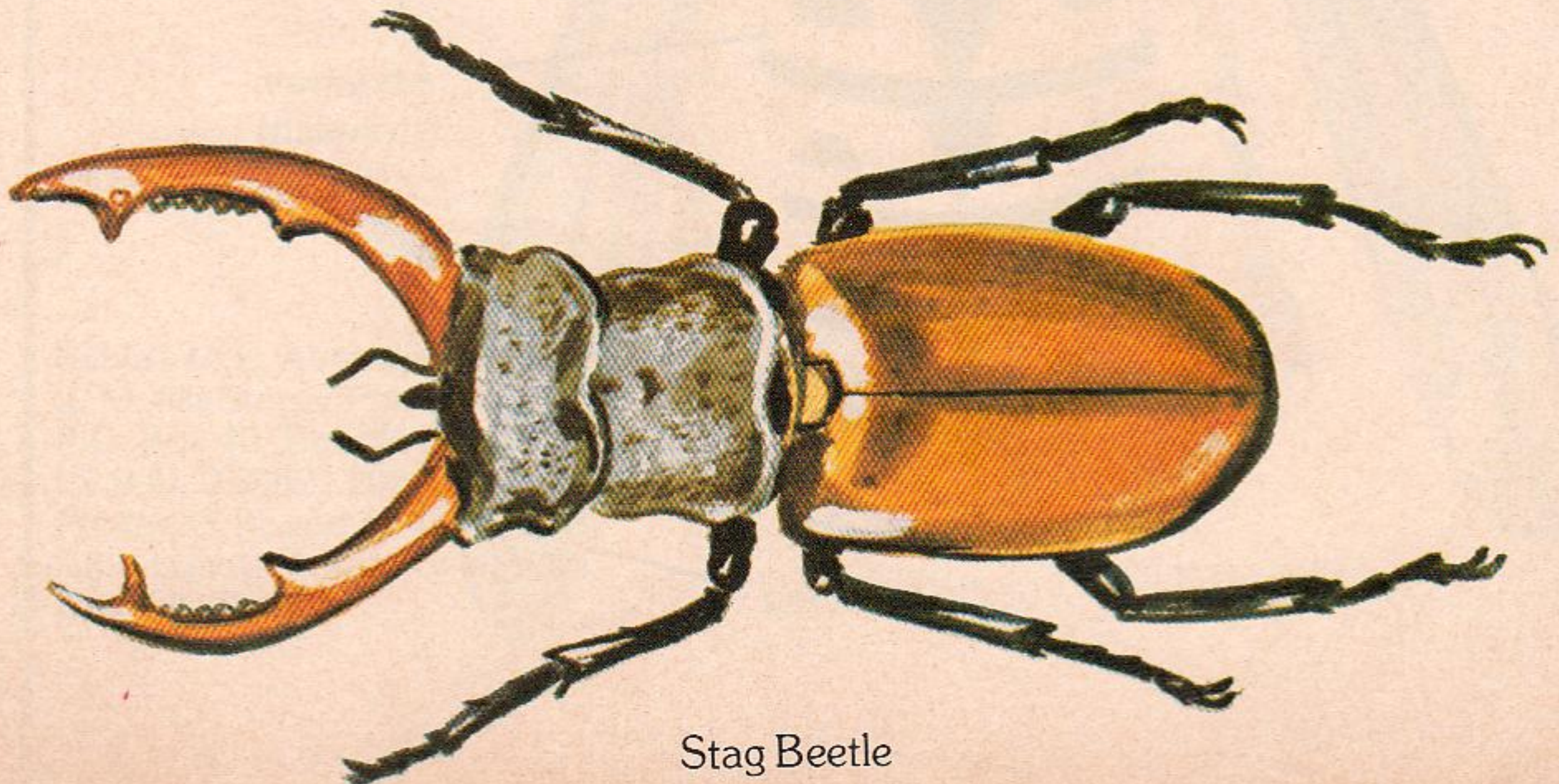
Ladybird



Red Wood Ant

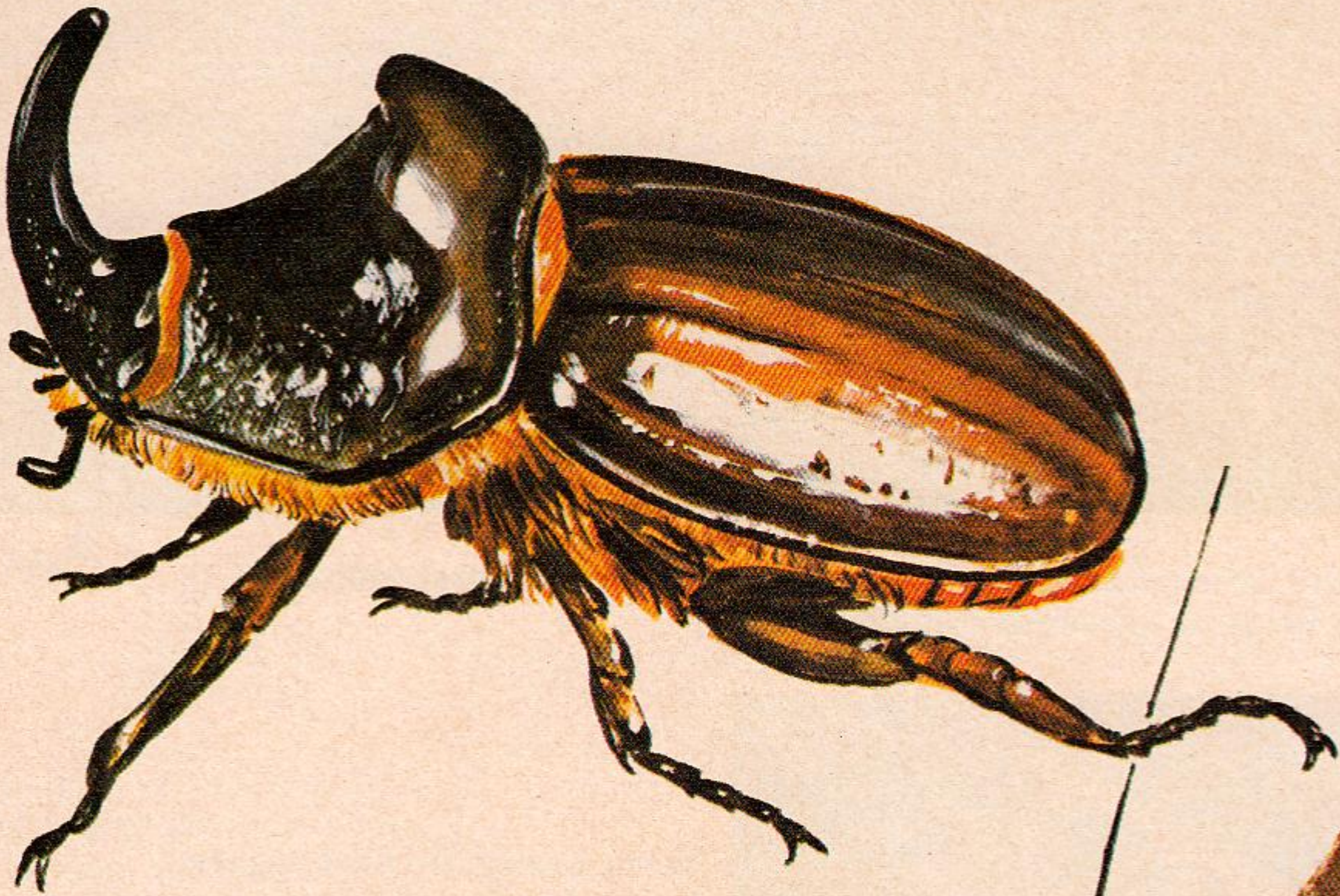


Swallowtail Butterfly



Stag Beetle

Insects do not have an internal skeleton, instead they have a hard shell or skin, on the outside of their bodies ...

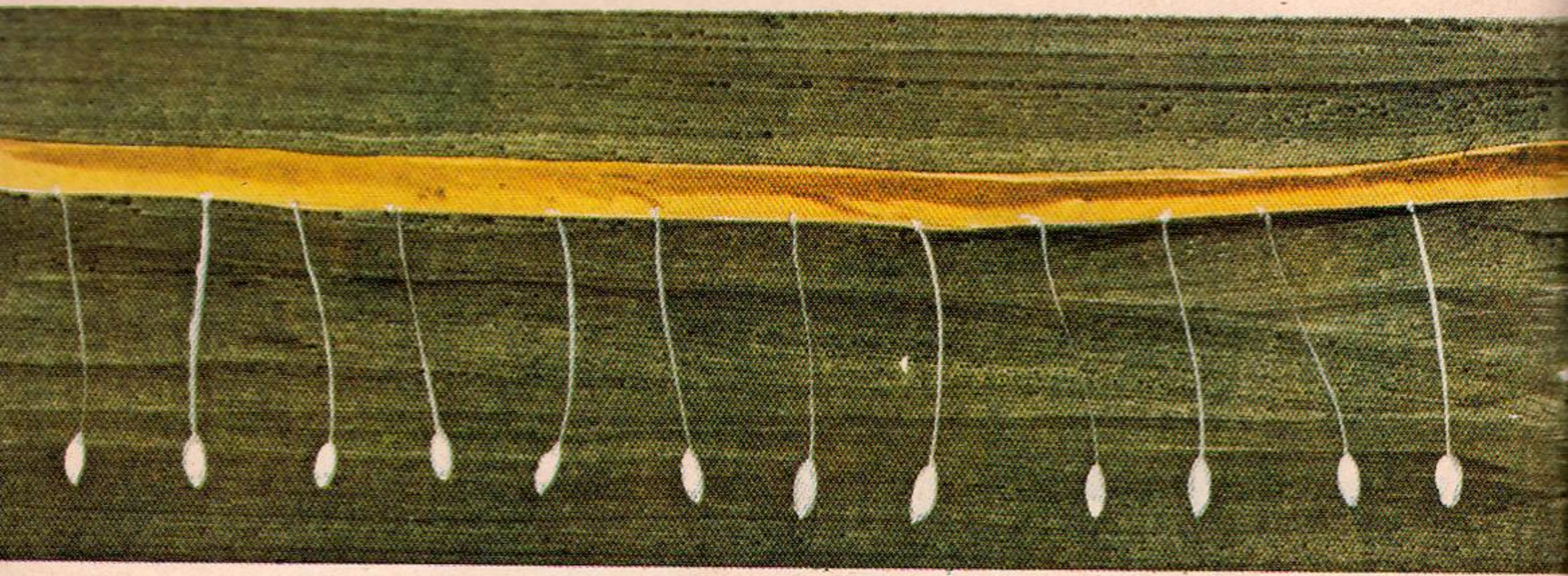


like this beetle one of the largest from South Brazil, the *Rhinoceros Beetle*,

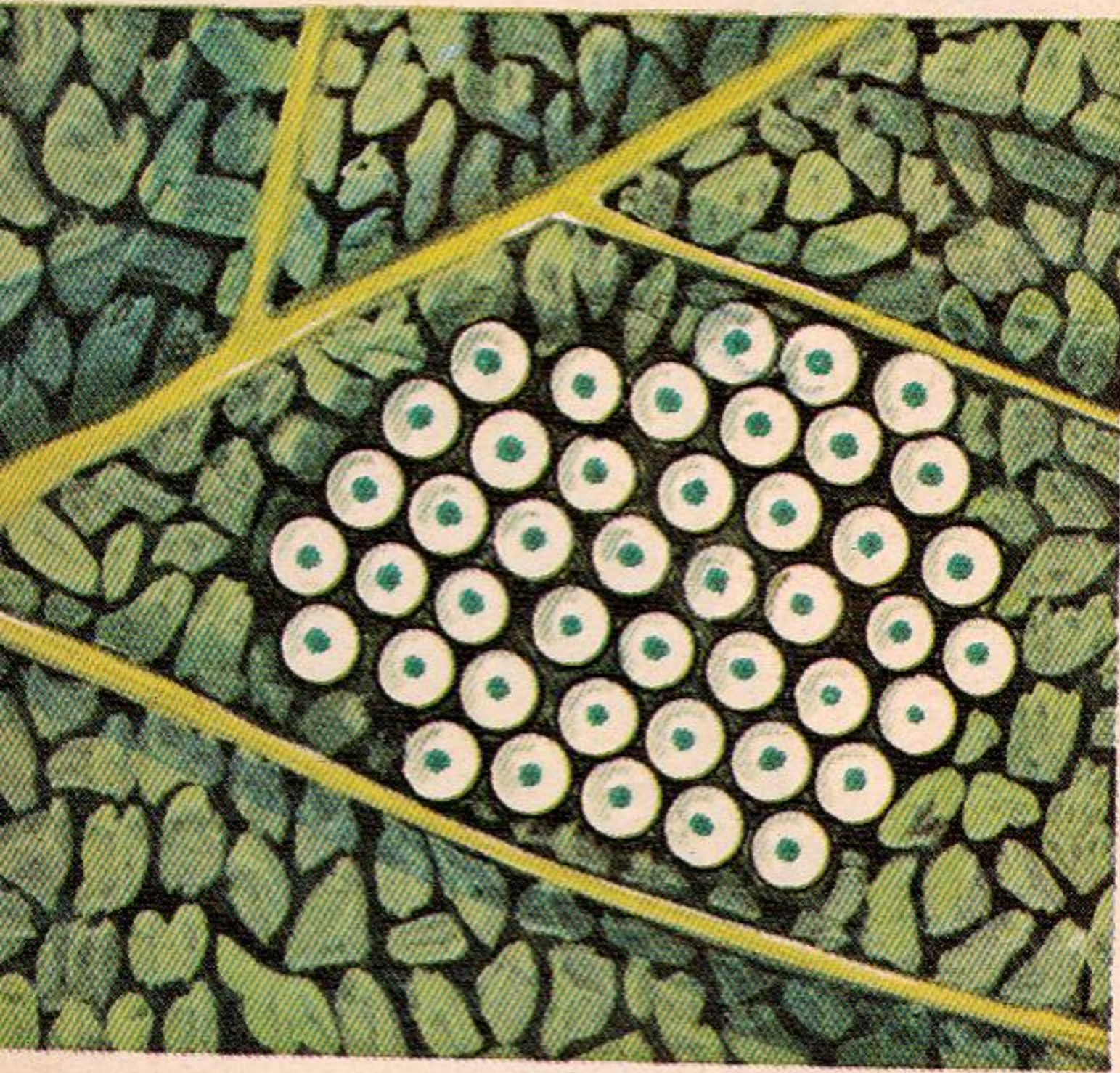
and the New Zealand Weta that lives in rotten wood on old trees.



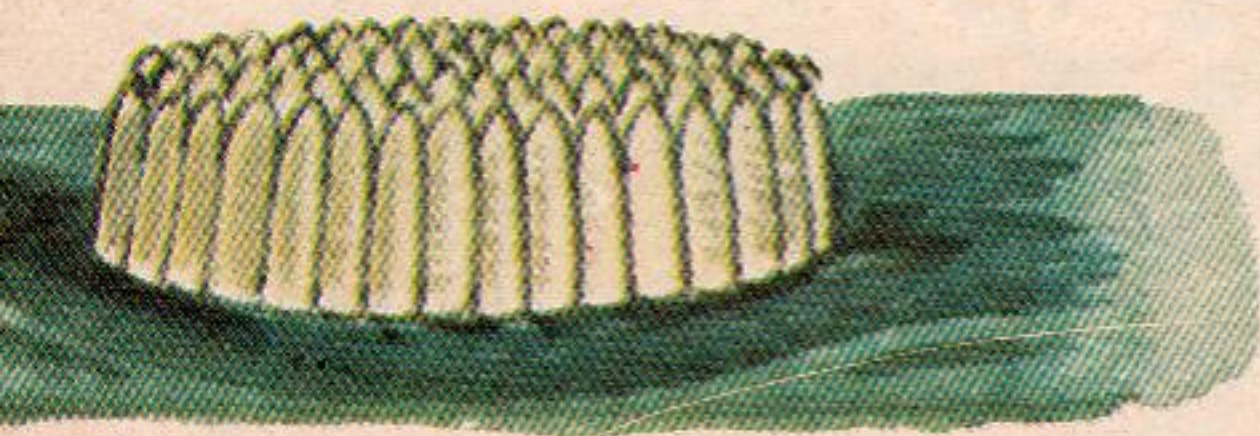
Most insects lay eggs, only a few give birth to live young.



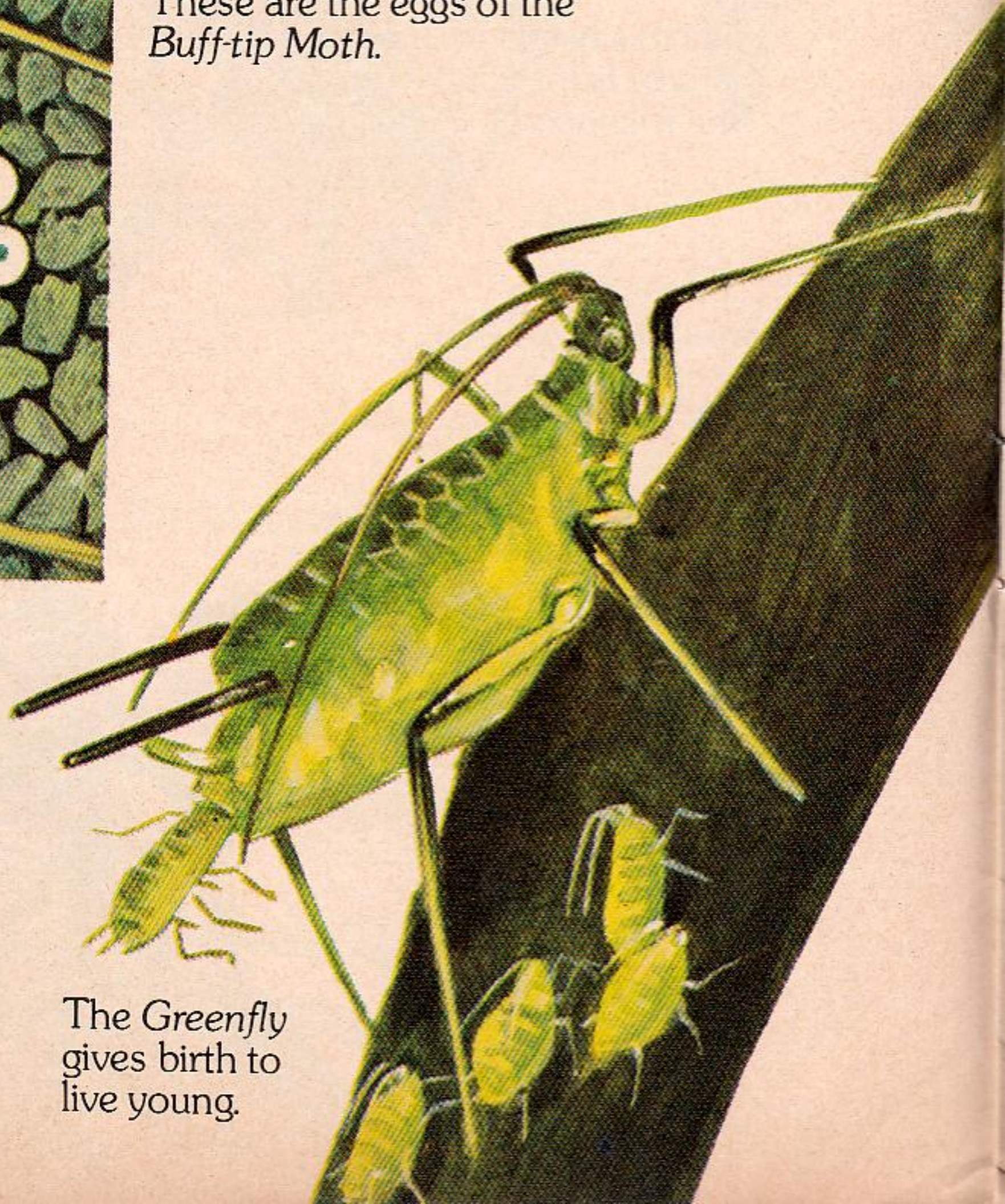
The eggs of certain *Lacewing Flies* are suspended safe from predators, from tree twigs, on gossamer threads (above).



Some insects lay their eggs on the underside of leaves. These are the eggs of the *Buff-tip Moth*.



Mosquitoes lay their eggs on the surface of the water. They float like rafts.



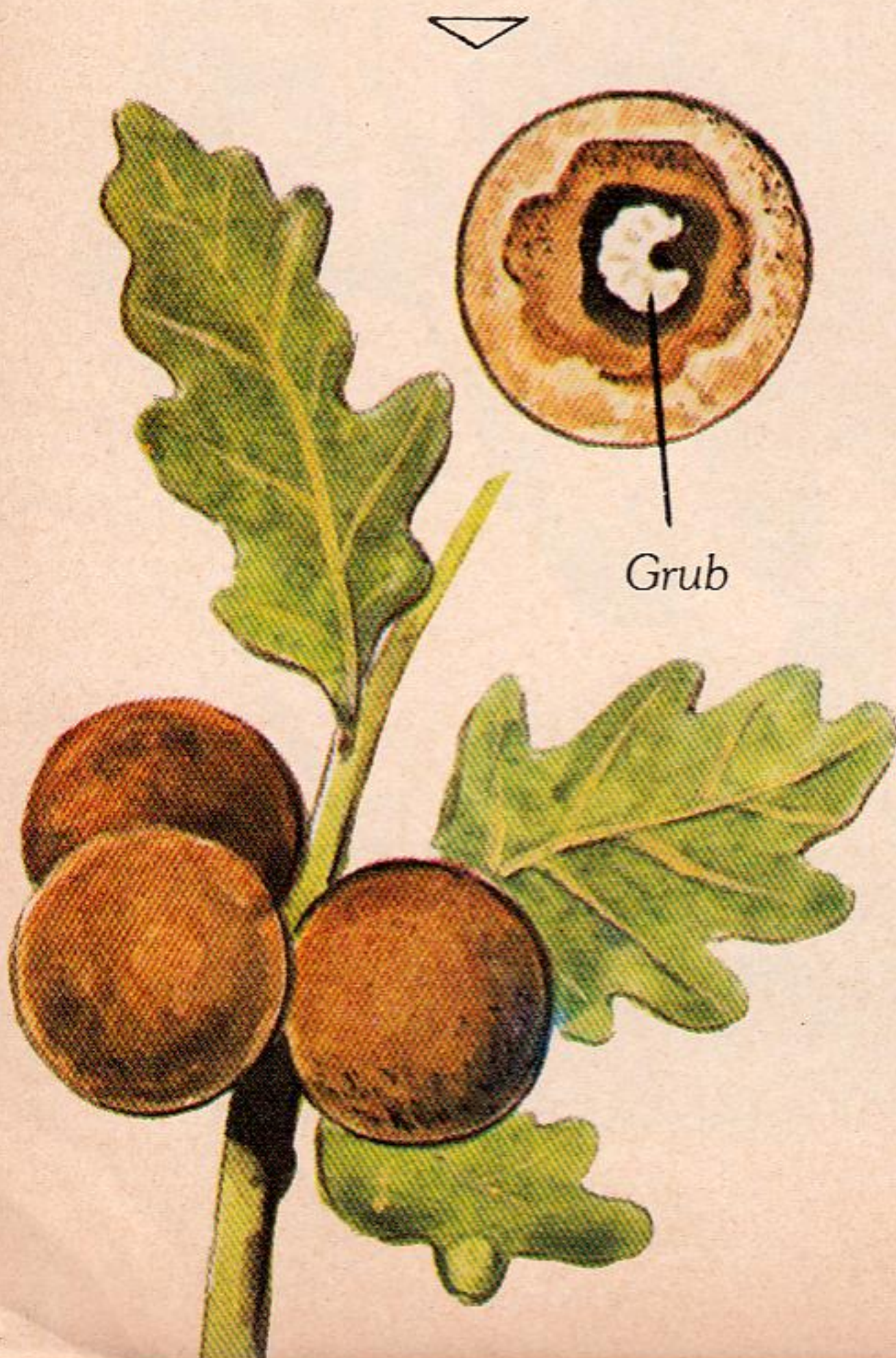
The *Greenfly* gives birth to live young.

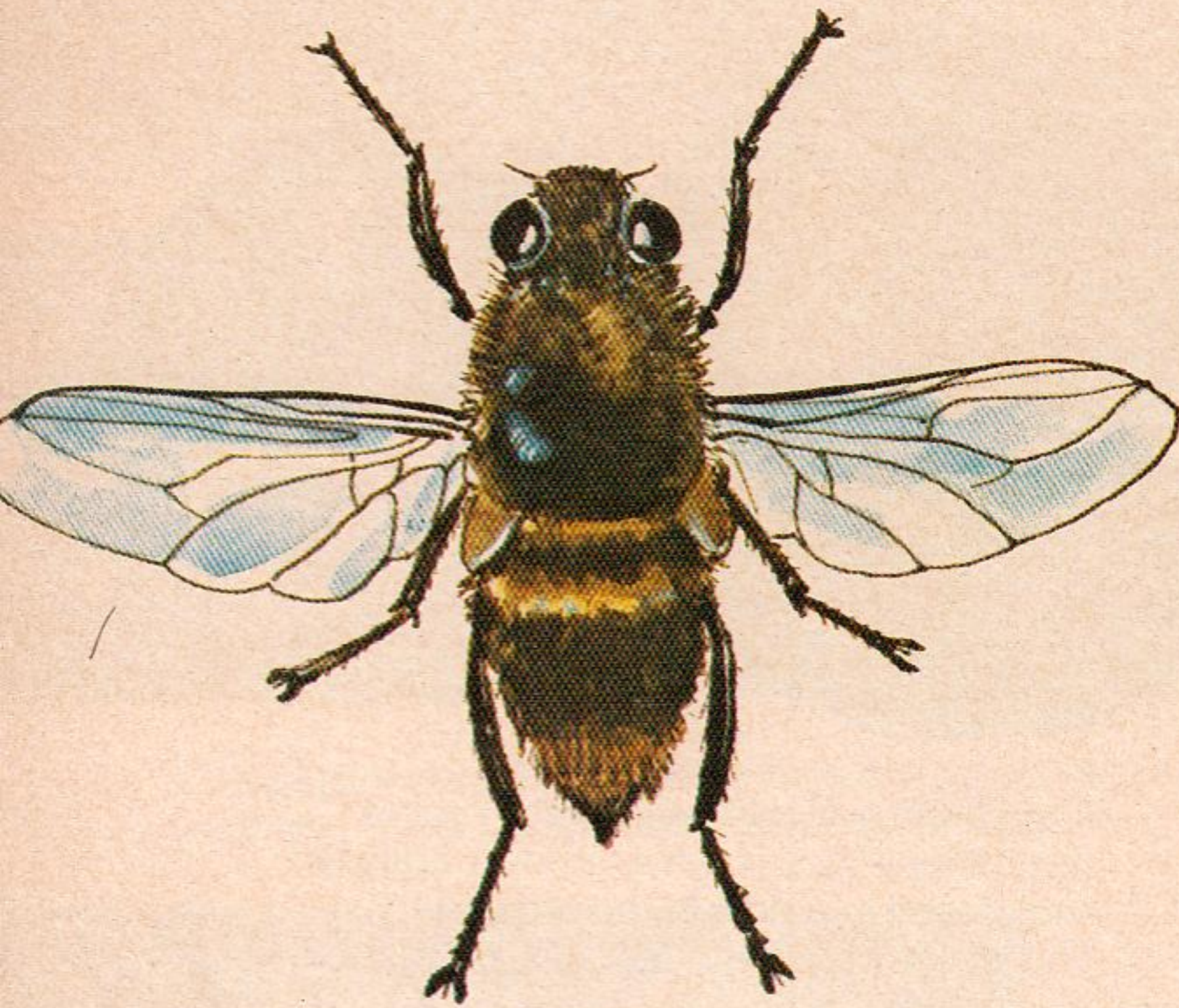
Scarab Beetles make a ball of dung, which they bury. The female lays her eggs in it, and when they hatch, the larvae feed on the dung.



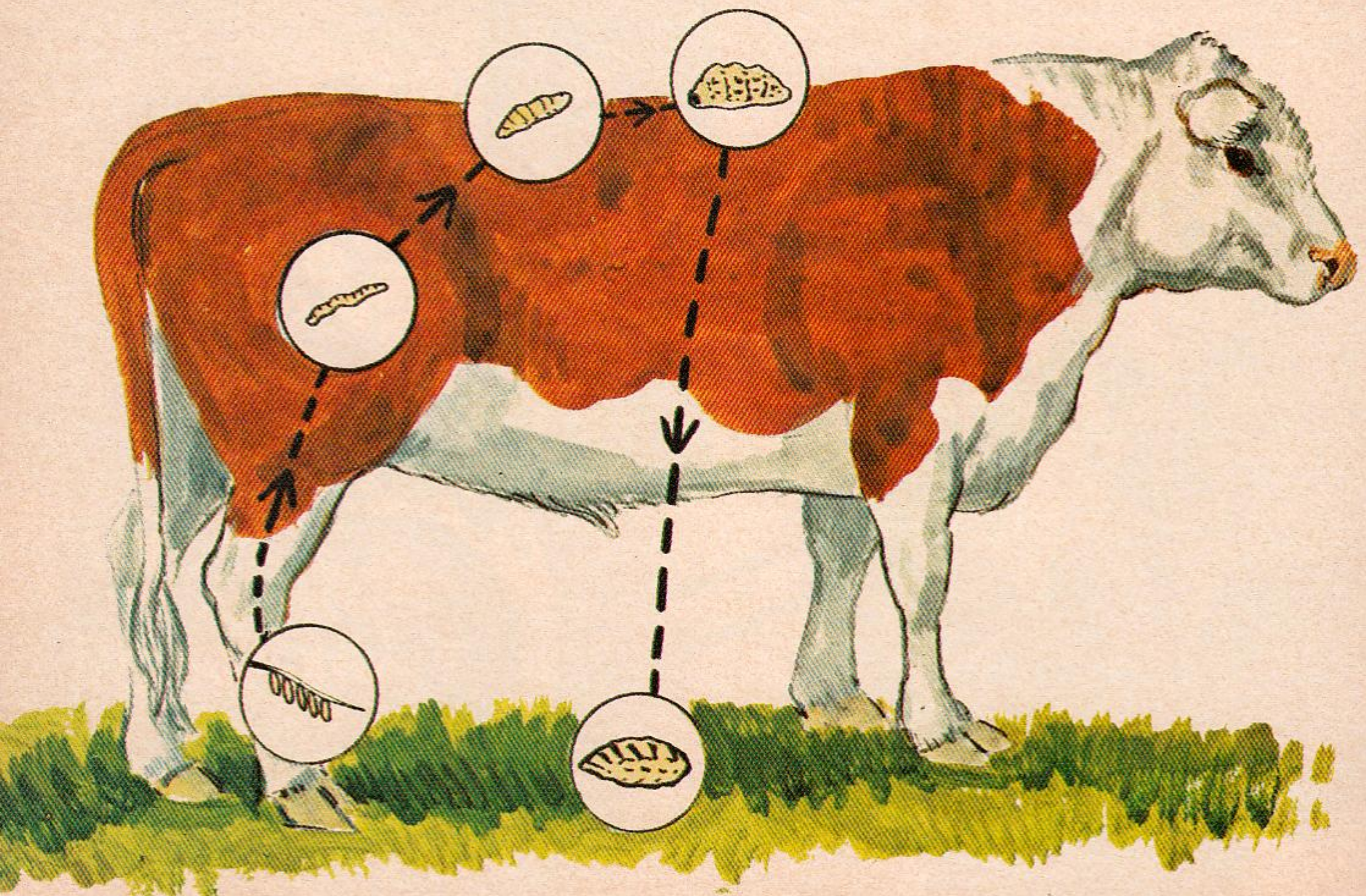
The *Hunting Wasp* lays an egg on the caterpillar which she has stung, paralysed and placed in a hole in the ground. The larvae hatch and feed on the caterpillar.

Marble galls or Oak apples are formed when a tiny wasp lays her eggs in a bud on an Oak tree. The grub inside feeds on it.

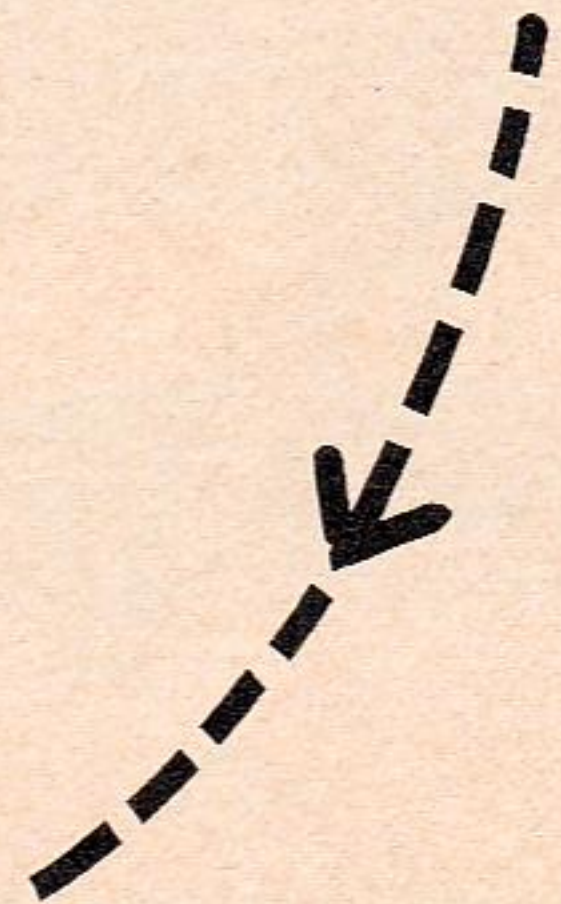
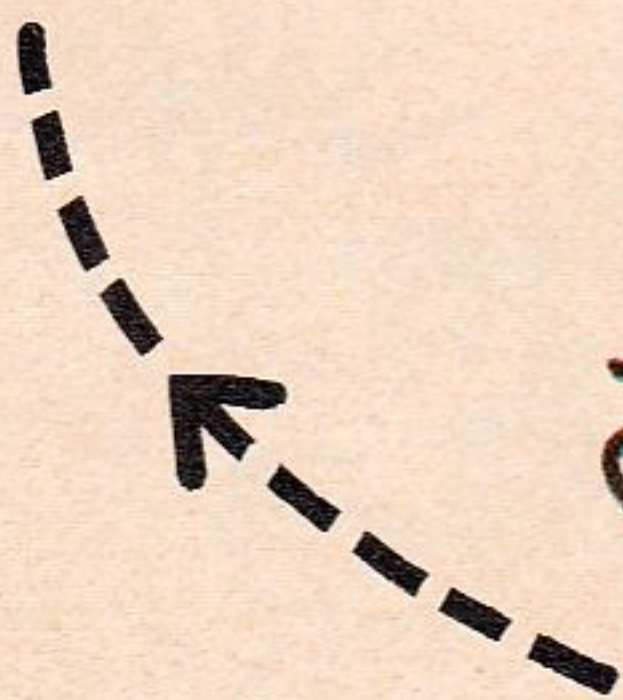




The *Warble Fly* is a parasite of cattle. It lays its eggs on the hairs of a beast's leg. When the larvae hatch they first penetrate the skin, and slowly migrate up to the beast's back. Here they form cysts and develop further. Then they bore through the skin, fall to the ground and pupate, from where the adult fly emerges to start a new cycle. The whole cycle takes one year.



GROWING AND CHANGING:



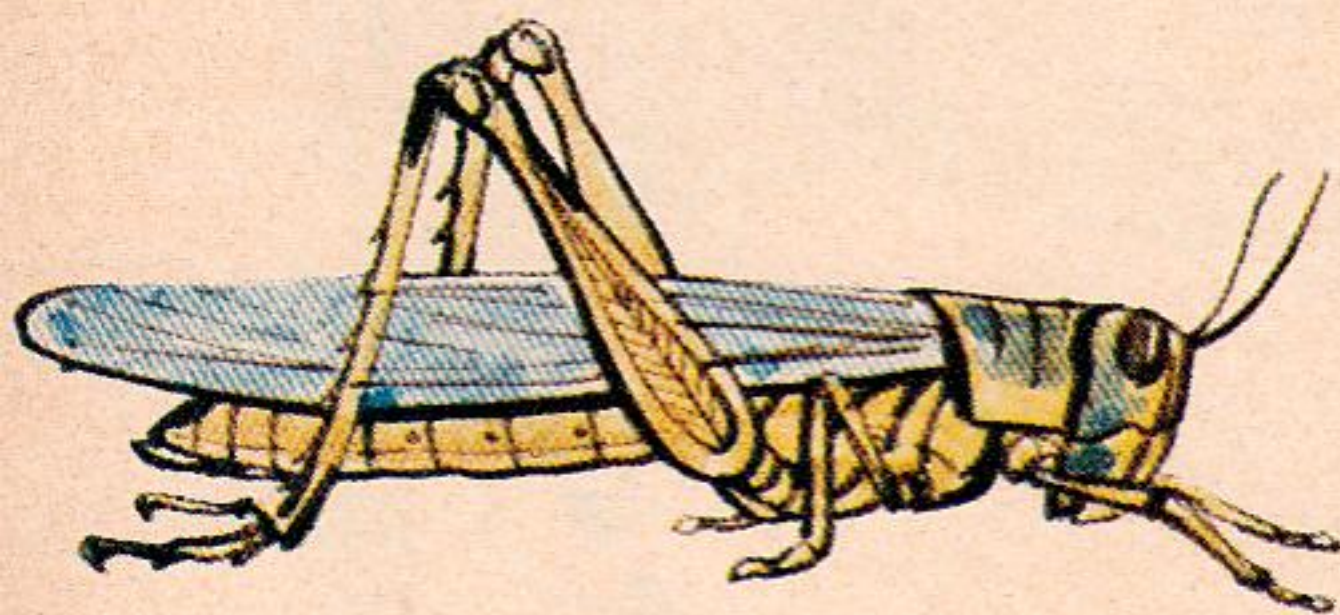
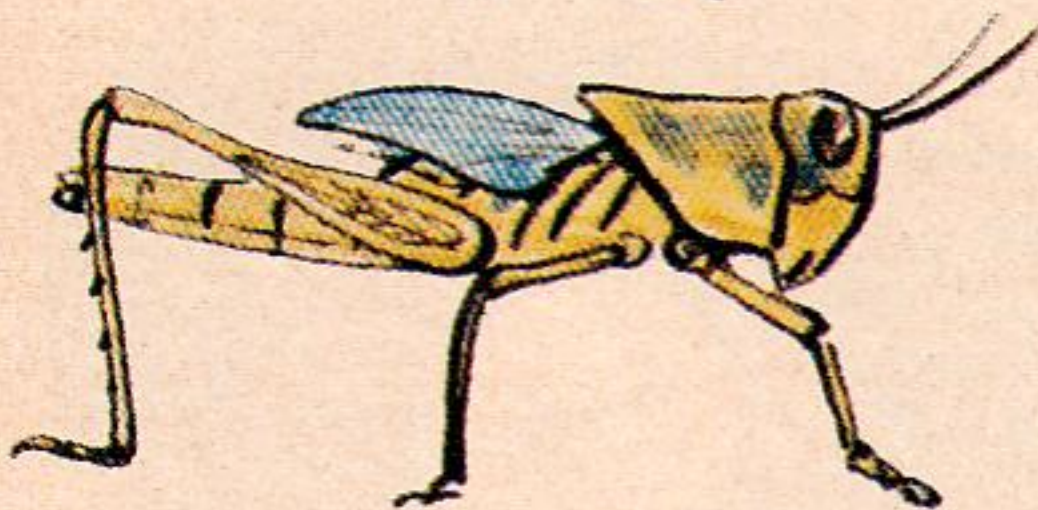
The *Monarch Butterfly* lays her eggs on the leaves of the *Swan plant*. The caterpillar hatches from the egg and feeds on the leaves. After moulting five or six times the caterpillar spins a pad of silk on the leaf or stalk, and hangs from it, then changes into a chrysalis. A week or two later the chrysalis splits and a *Monarch Butterfly* struggles out.

This process of change is called *Metamorphosis*.

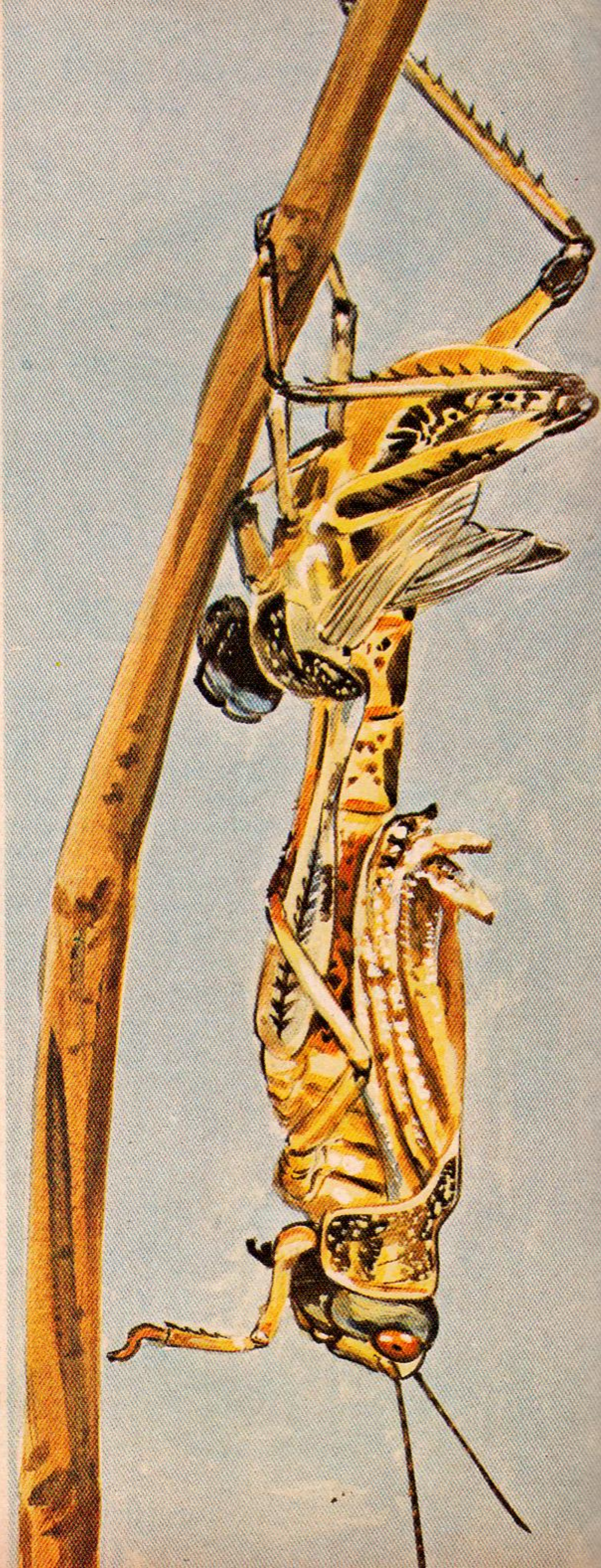
GROWING:

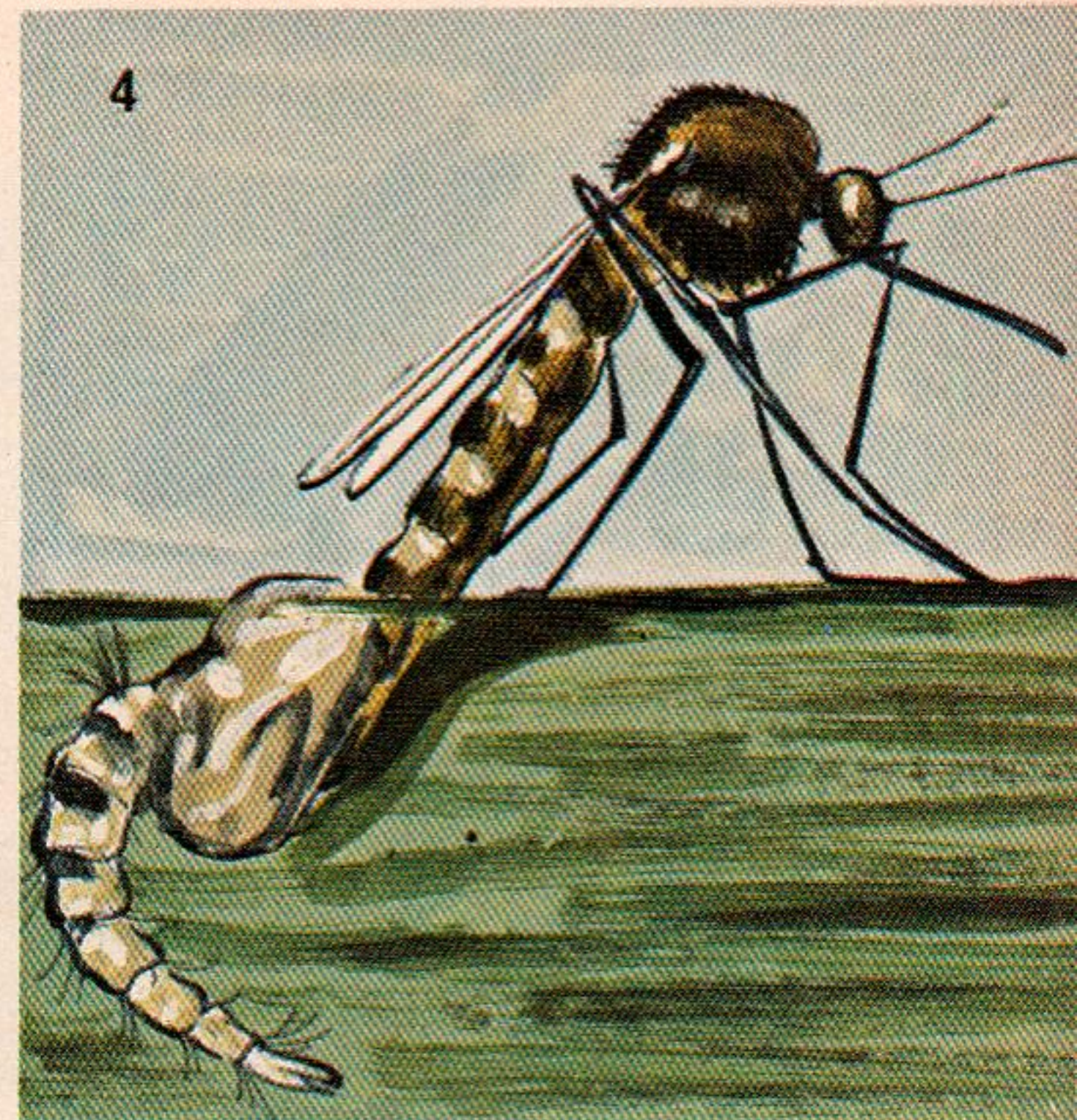
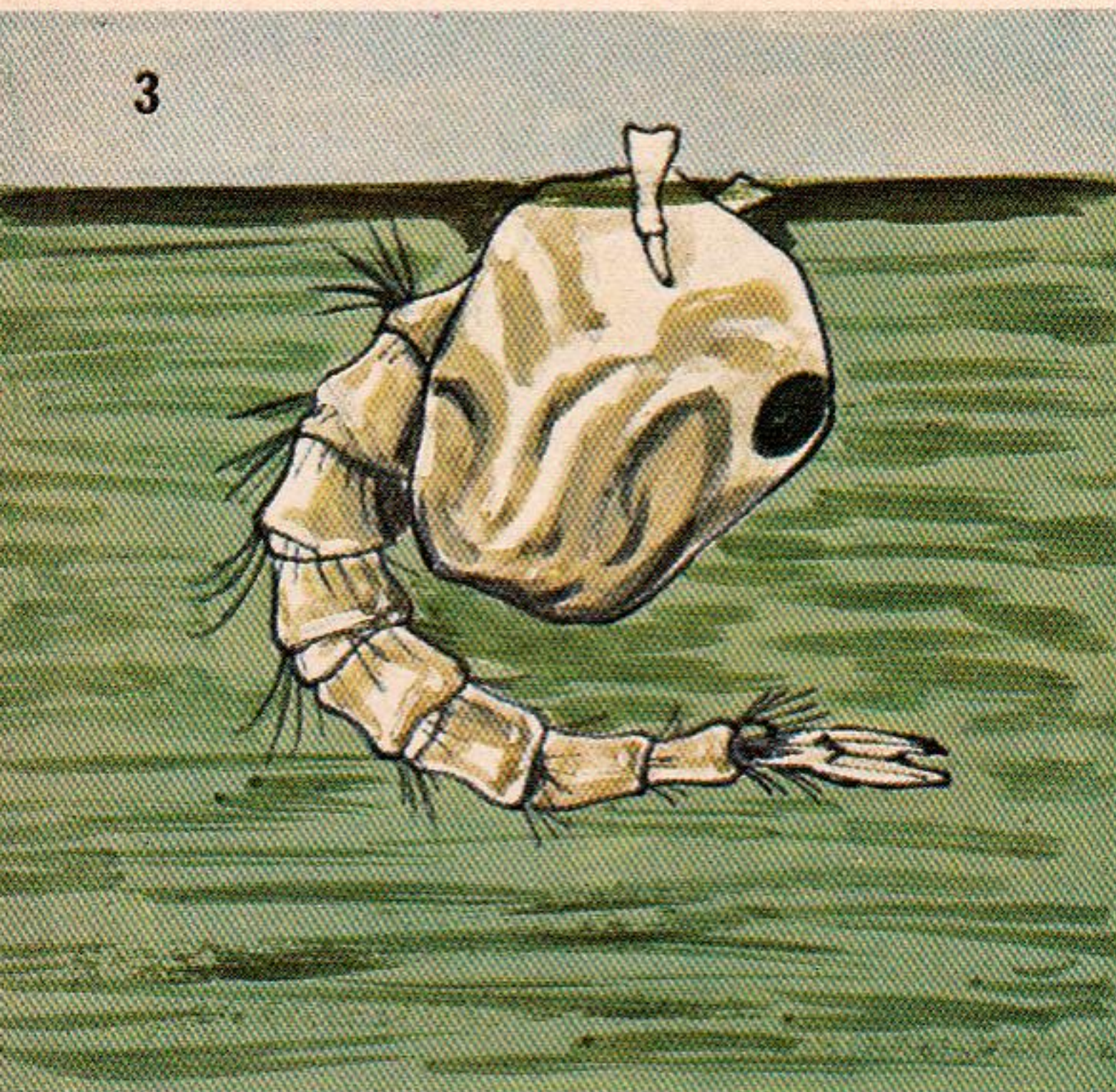
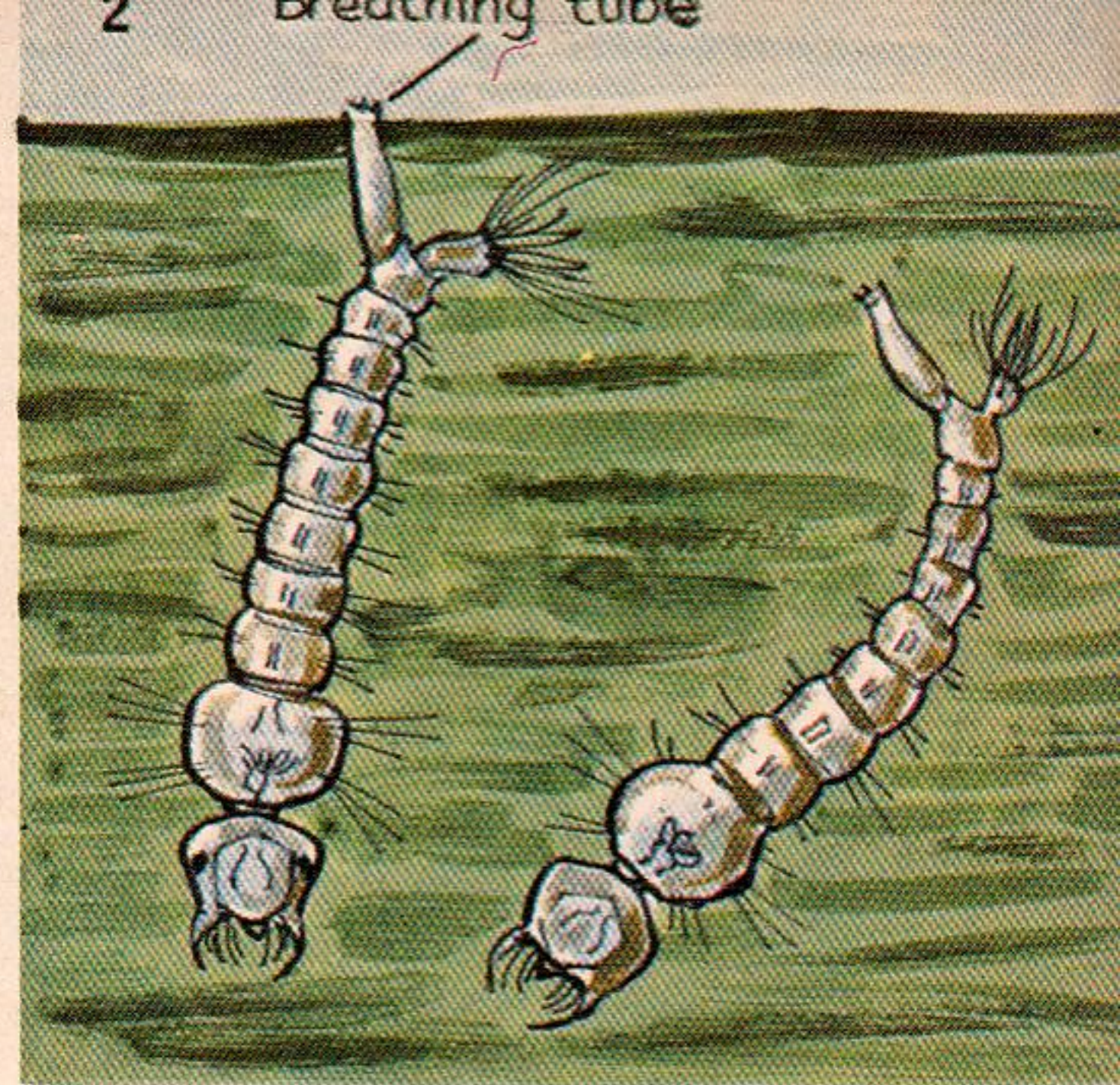
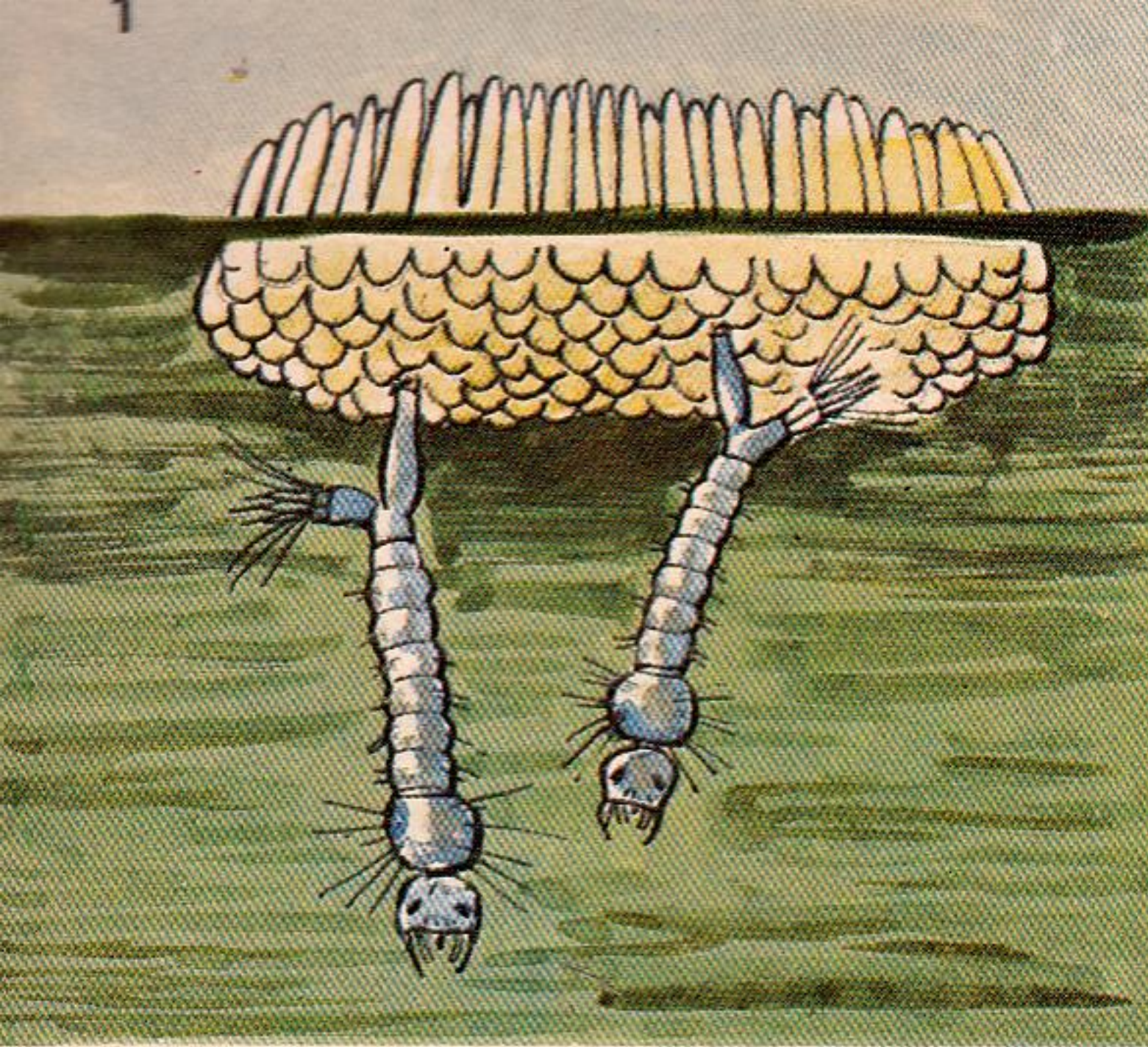
Young insects, called larvae, have no room to grow inside their hard skins. So from time to time they have to throw off their old skin. The old skin splits, and the insect climbs out of it, with a complete new skin. On the right is a picture of a *Desert Locust* emerging from the final moult.

This process is called an incomplete metamorphosis.



These three pictures above show how a *Desert Locust* gets bigger with each moult. Notice how the wings grow each time.





MOSQUITOES

1. The eggs of the Mosquito are laid on the surface of the water and form an egg-raft, containing about three hundred eggs.

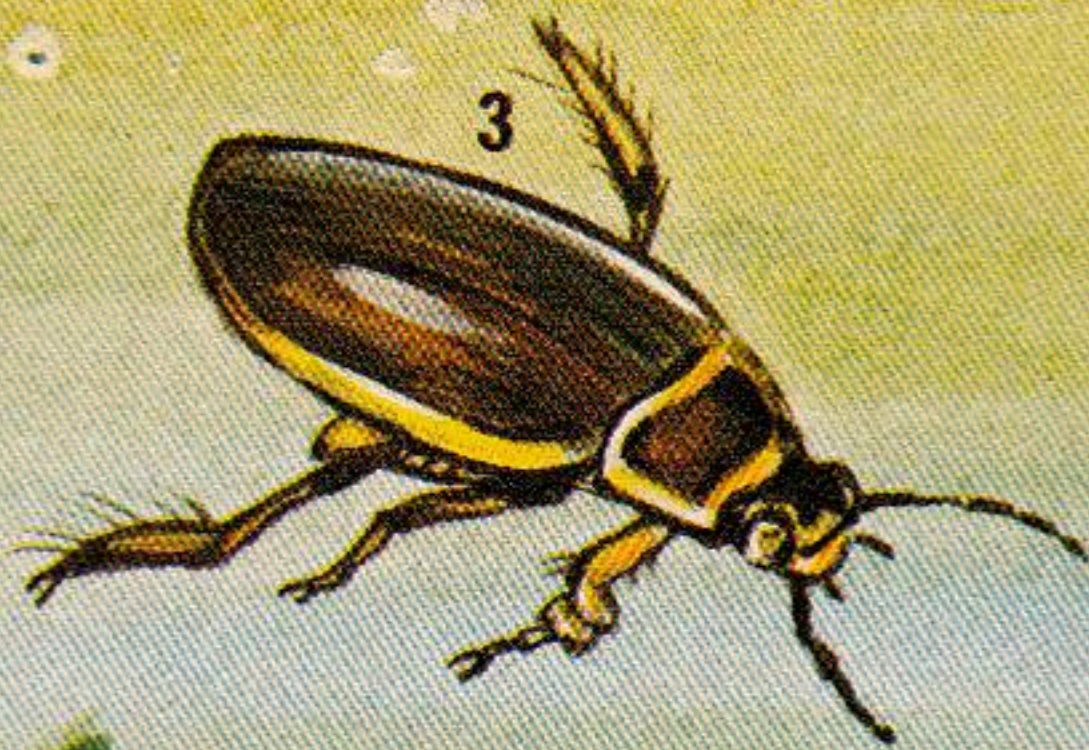
3. Each larvae turns into a pupa. It swims by flicking its abdomen. Inside the mosquito is slowly forming.

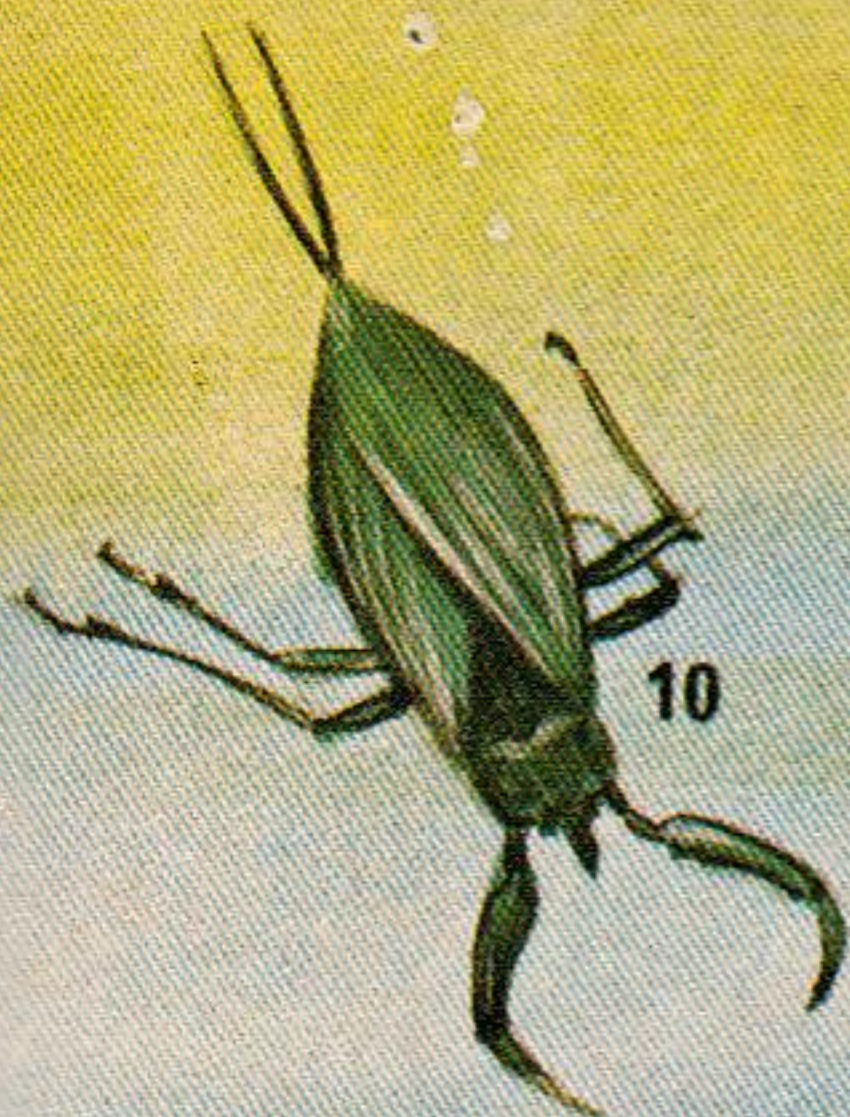
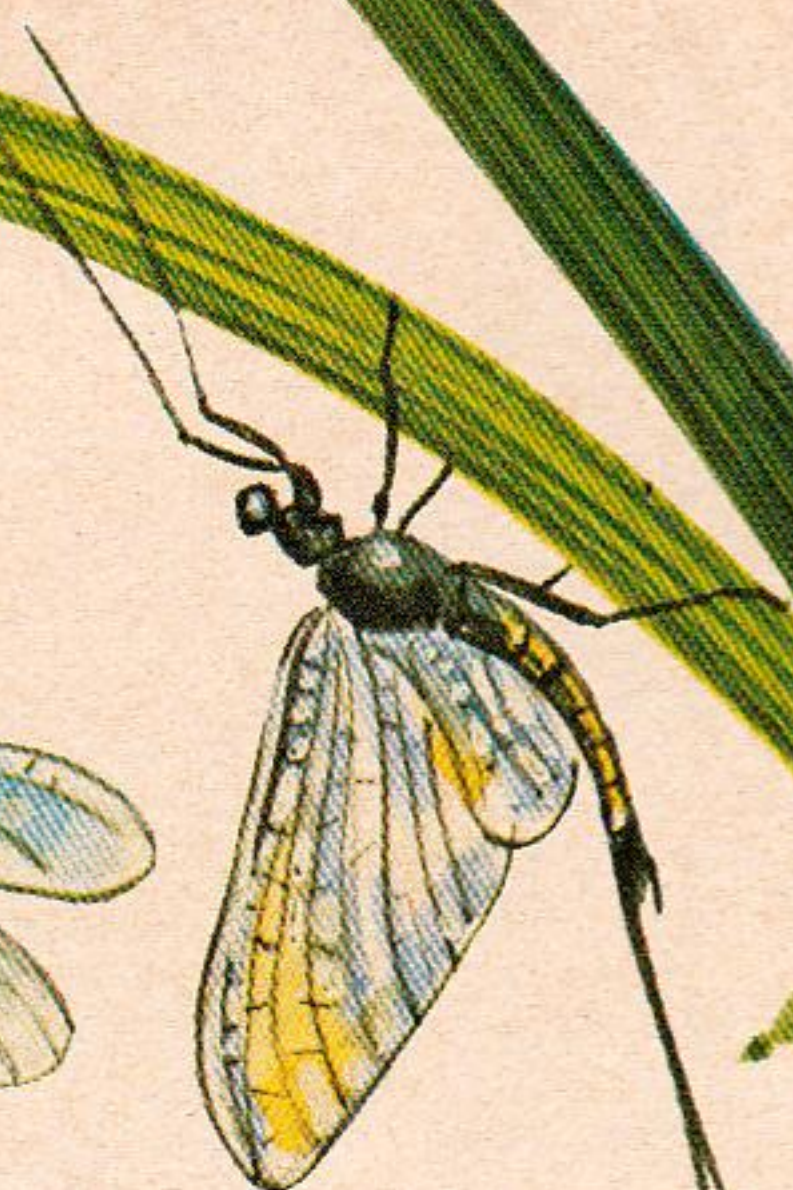
2. The eggs hatch into larvae. The larvae swim freely and come to the surface to breathe.

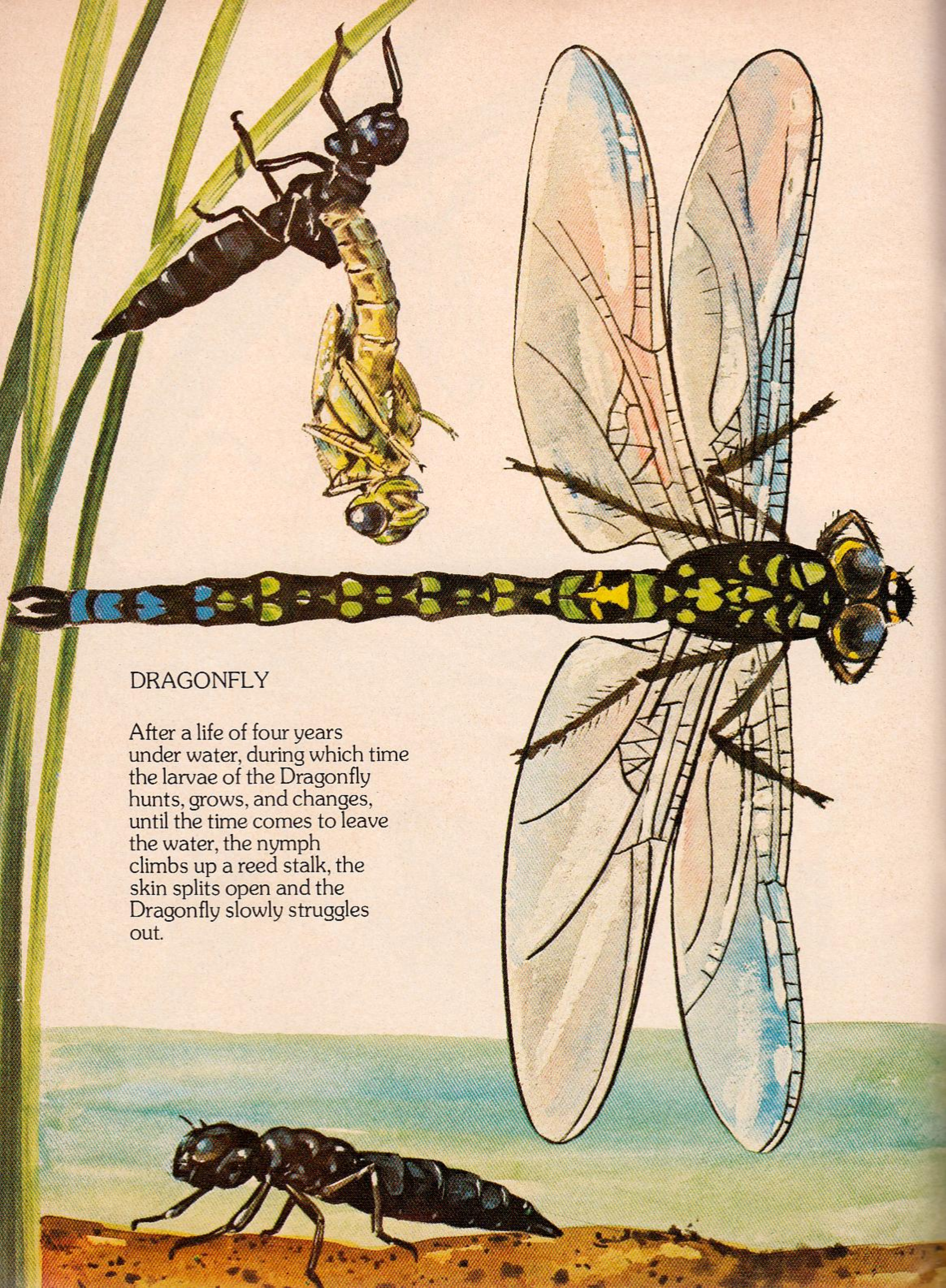
4. The pupal case splits, and the adult mosquito struggles out, resting for a while on the surface, while its wings enlarge and harden.

WATER INSECTS:

1. Whirligig Beetle.
2. Pondskeer.
3. Great Diving Beetle.
4. Larvae of Great Diving Beetle.
5. Caddis Larvae.
6. Damsel Fly.
7. Mayfly.
8. } Water Boatman.
9. }
10. Water Scorpion.
11. Water Beetle.
12. Mayfly nymph.







DRAGONFLY

After a life of four years under water, during which time the larvae of the Dragonfly hunts, grows, and changes, until the time comes to leave the water, the nymph climbs up a reed stalk, the skin splits open and the Dragonfly slowly struggles out.



The New Zealand
Stick Insect.



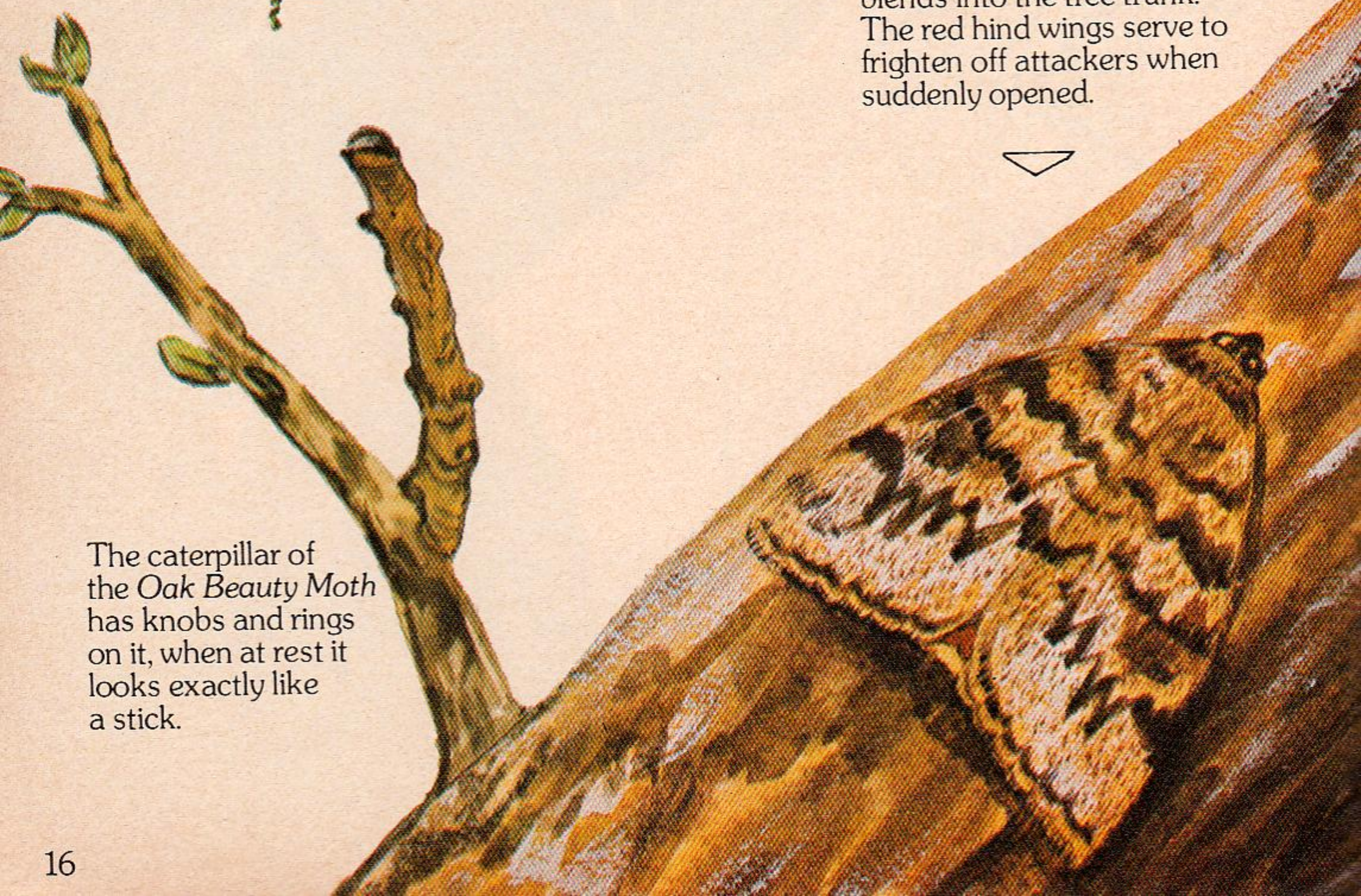
CAMOUFLAGE

Camouflage in the insect world is used in many ingenious ways. Sometimes the colour of an insect is like the surroundings where it usually rests. In others the patterns of the colours break up a wing's outline. Some insects are coloured to look like harmful insects. Some caterpillars are exactly the colour and shape of twigs.

Leaf insect.



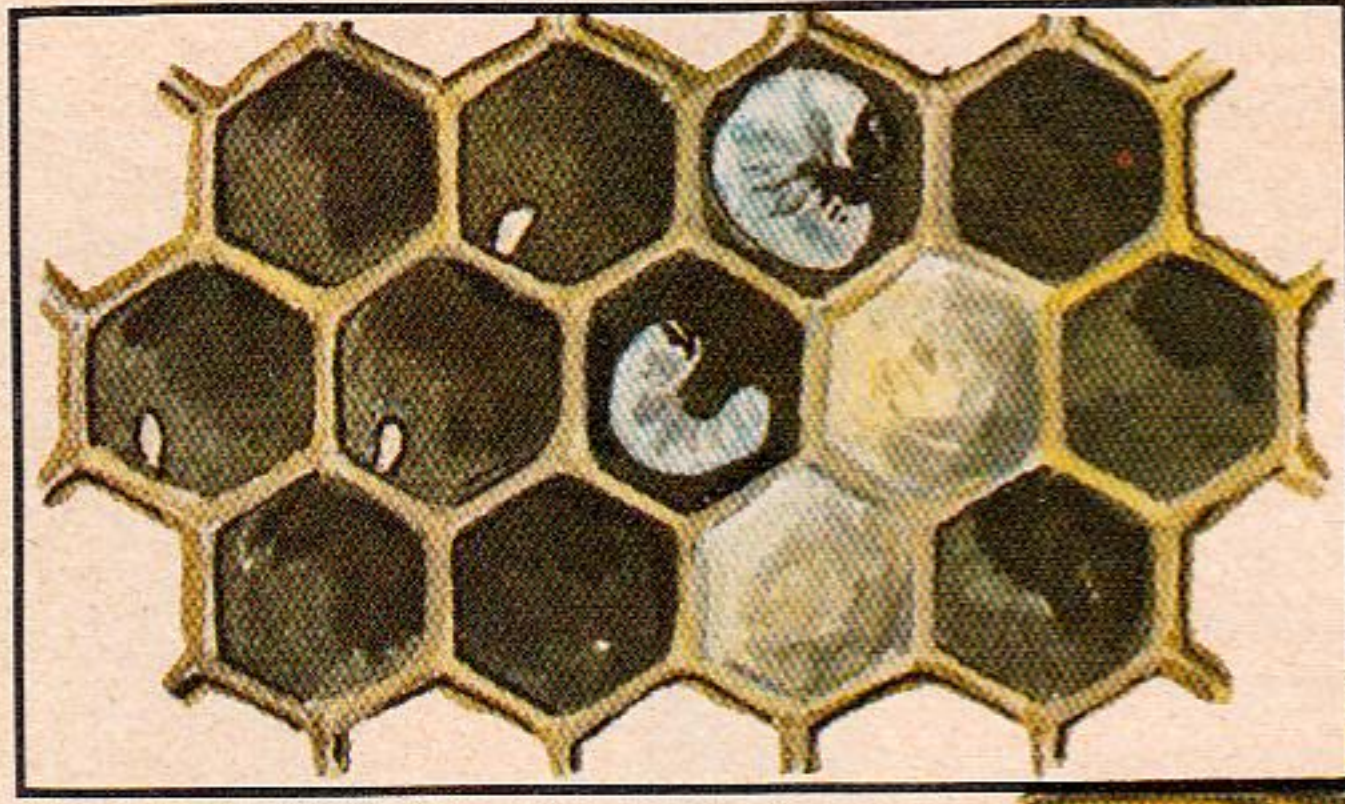
The Red Underwing Moth blends into the tree trunk. The red hind wings serve to frighten off attackers when suddenly opened.



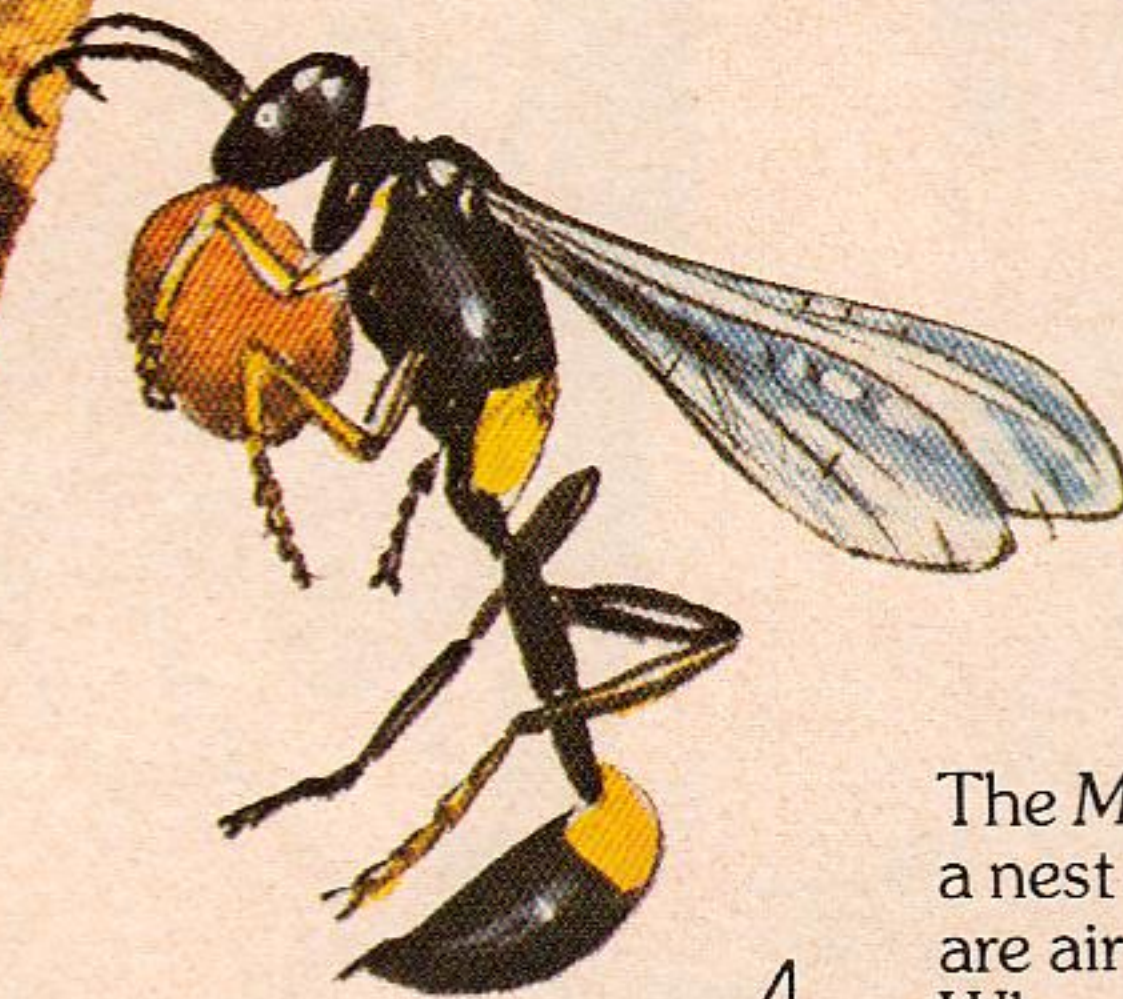
The caterpillar of the Oak Beauty Moth has knobs and rings on it, when at rest it looks exactly like a stick.

INSECT BUILDERS:

Here are some of the ingenious structures created by the insect world.



On the right is a cut-away view of a wasp's nest, showing the tiers of paper cells. The many layered wall insulates the nest against changing temperatures. Inset shows the structure of the cells, some with eggs and wasp larvae.



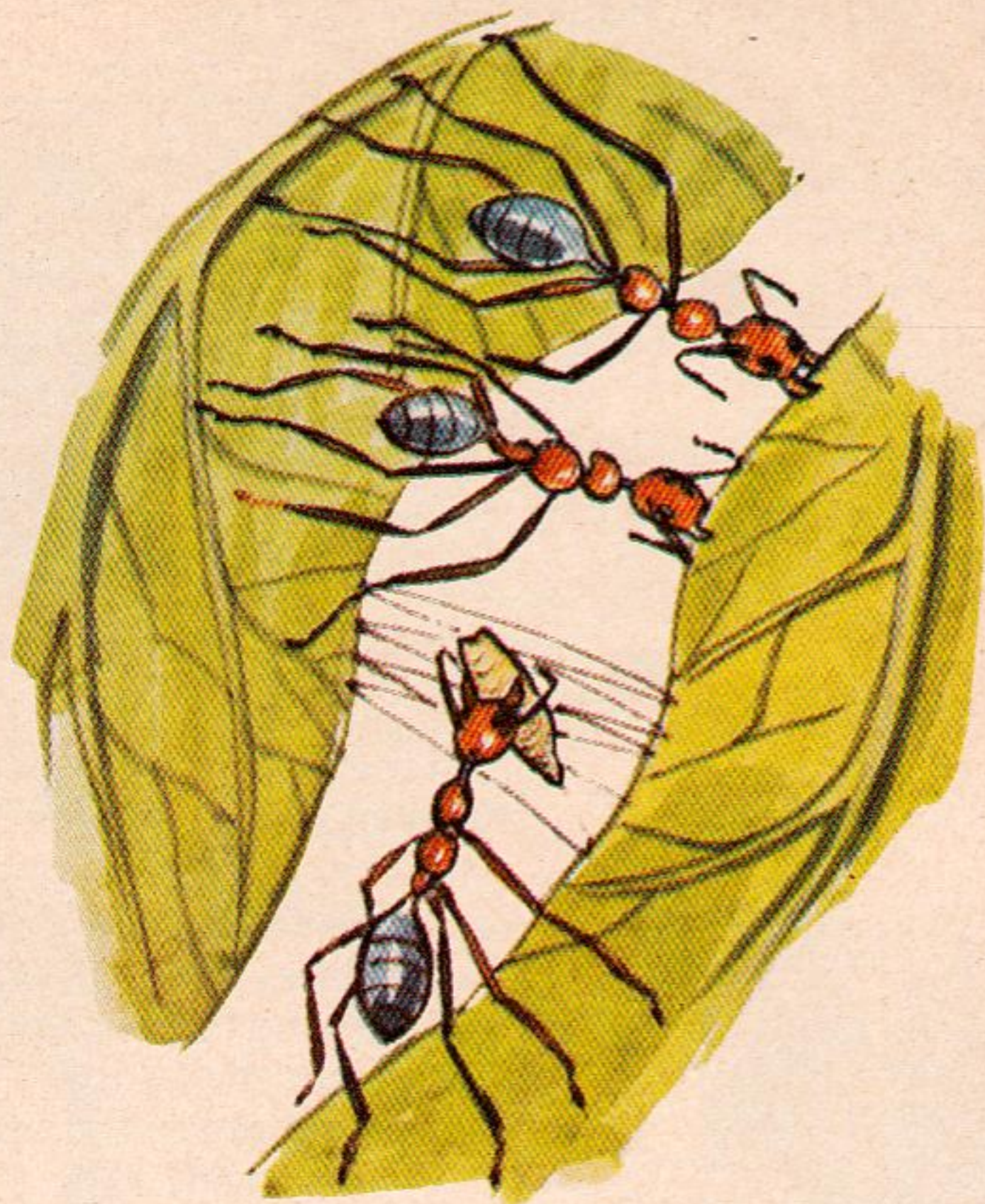
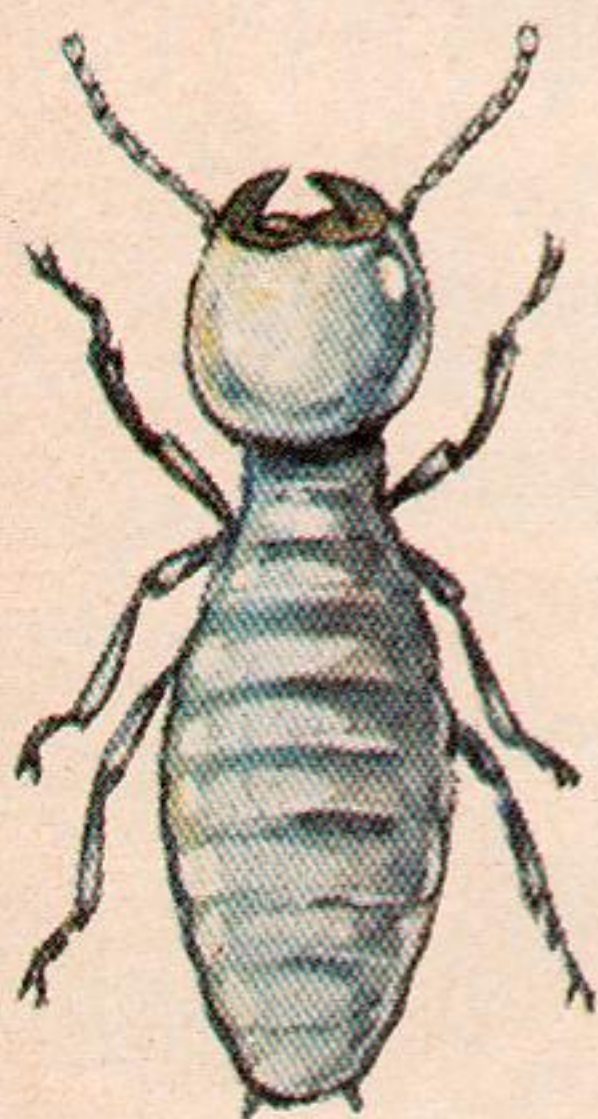
The *Mud-dauber Wasp* builds a nest out of pellets of mud, which are air-lifted to the site. When completed the wasp fills the nest with paralysed spiders, lays her egg on the last one, and seals up the nest with mud.

The amazing sky-scraper
of the insect world, nearly
twenty feet high,
built by the little
Termites of Africa.

This nest also extends
underground, and houses
a whole colony of
Termites.

Built of particles of
soil stuck together with
their saliva, it sets as
hard as concrete.

Below, is the
worker termite.



Some ants live in trees
and make their nest inside
leaves they have sewn together.
Several ants hold the leaves
together, while other ants
using a larvae which
gives out silk, passes
it back and forwards
along the leaf edges
sewing them together.



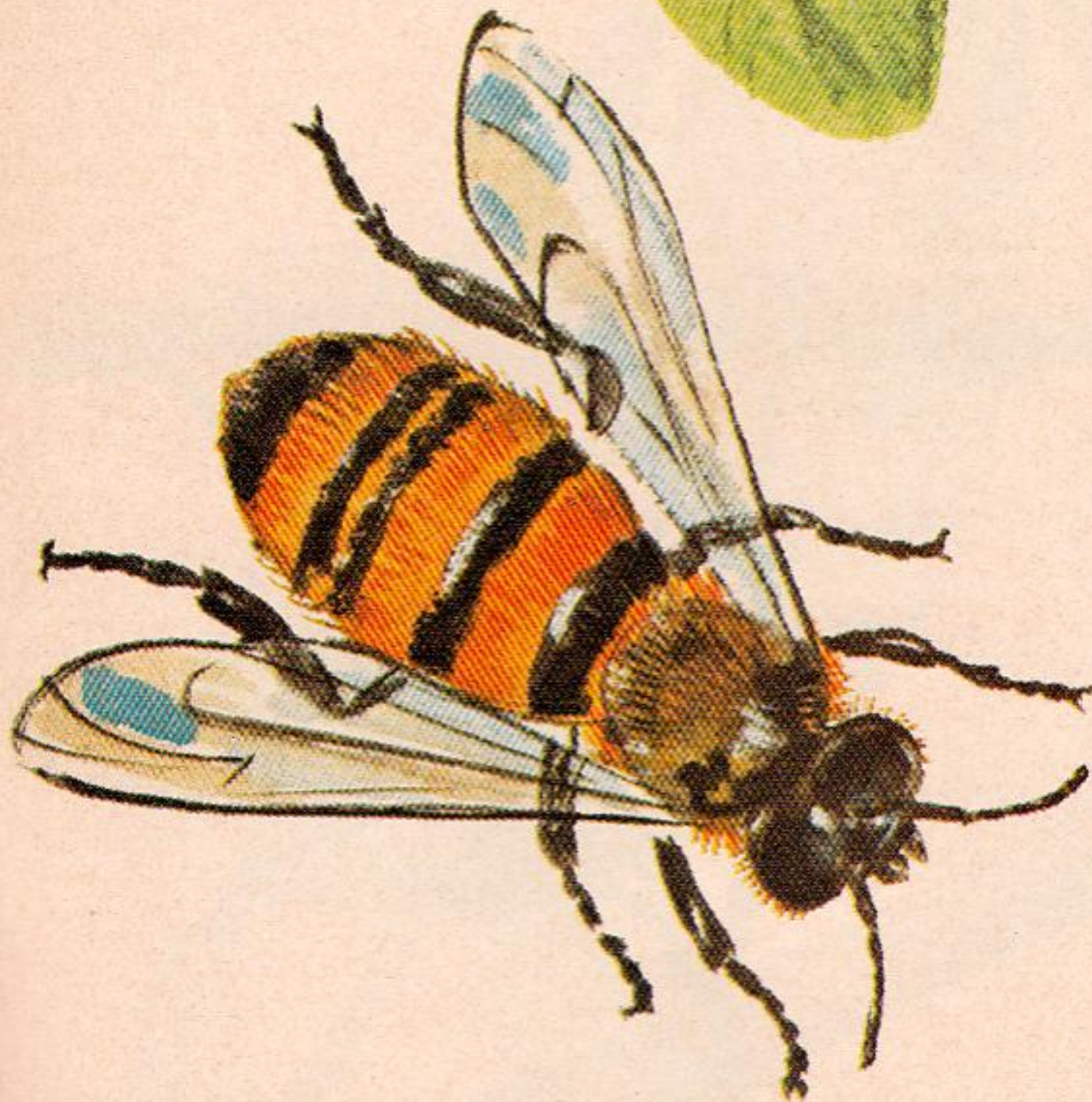
COMMUNITIES:

Some insects live in colonies that are very highly organised. Bees live in colonies. One bee called the *Honey Bee* lives in very large colonies.

Each bee in the colony has a special function.

The *Worker Bee* does all the work of collecting pollen, making honey, maintaining the hive, and rearing the young.

Note the pollen bags on the hind legs.



The *Drone* is the male bee, and his only function is to mate with the *Queen Bee*.



The *Queen Bee* only has one function, that is to lay all the eggs.

ANTS

Ant communities are very complex. Some ant communities work as farmers, some as soldiers, some as harvesters.

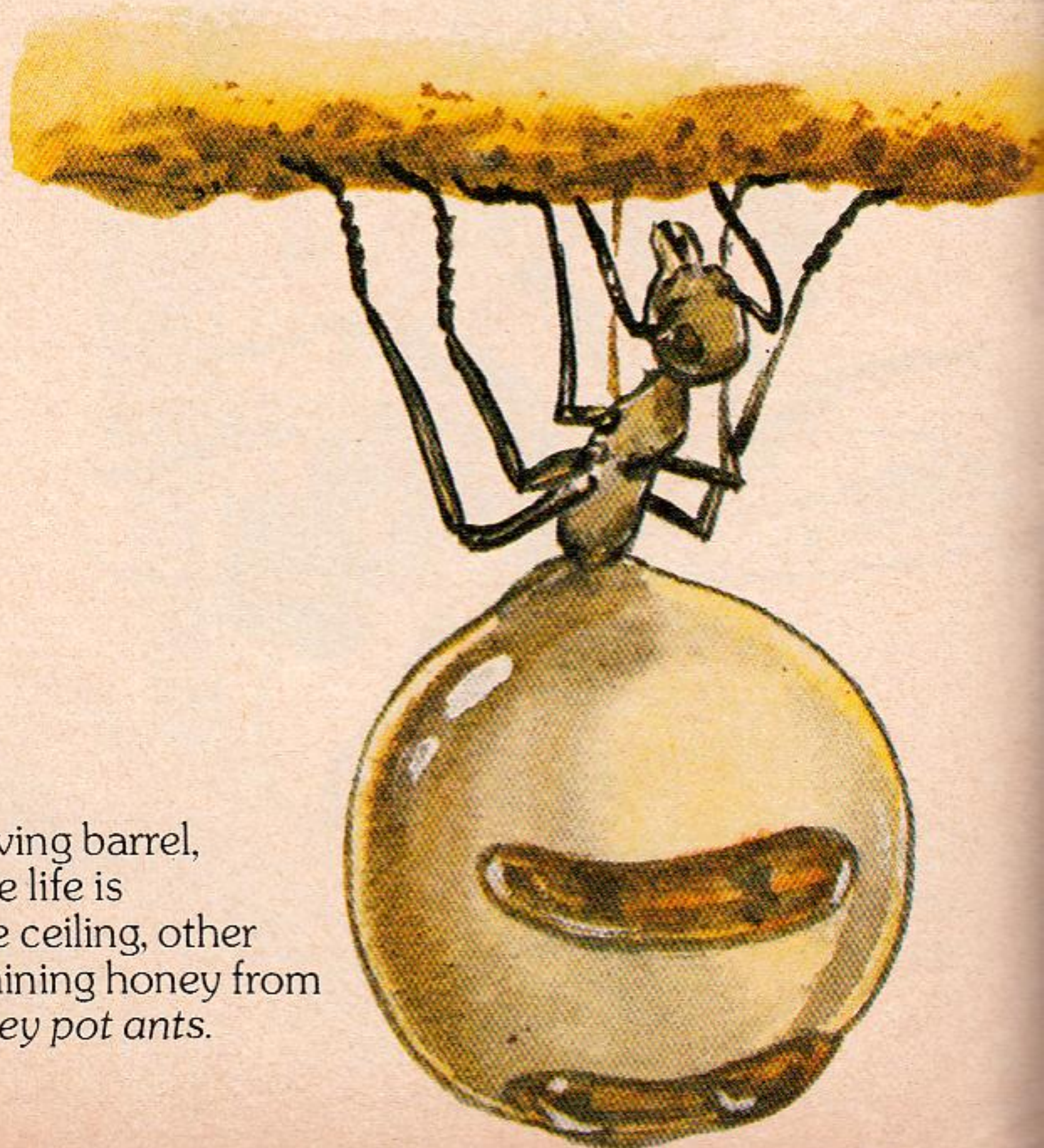
The *Leaf Cutter Ants* carry the pieces of leaves underground to their nest, where they serve as compost to grow mushrooms, which is their sole food.



Some ants look after Greenfly the way a farmer looks after his cows. They like to eat the honeydew that the Greenfly secretes.



This ant is actually a living barrel, storing honey. Its whole life is spent hanging from the ceiling, other ants in the colony obtaining honey from it. They are called *Honey pot ants*.

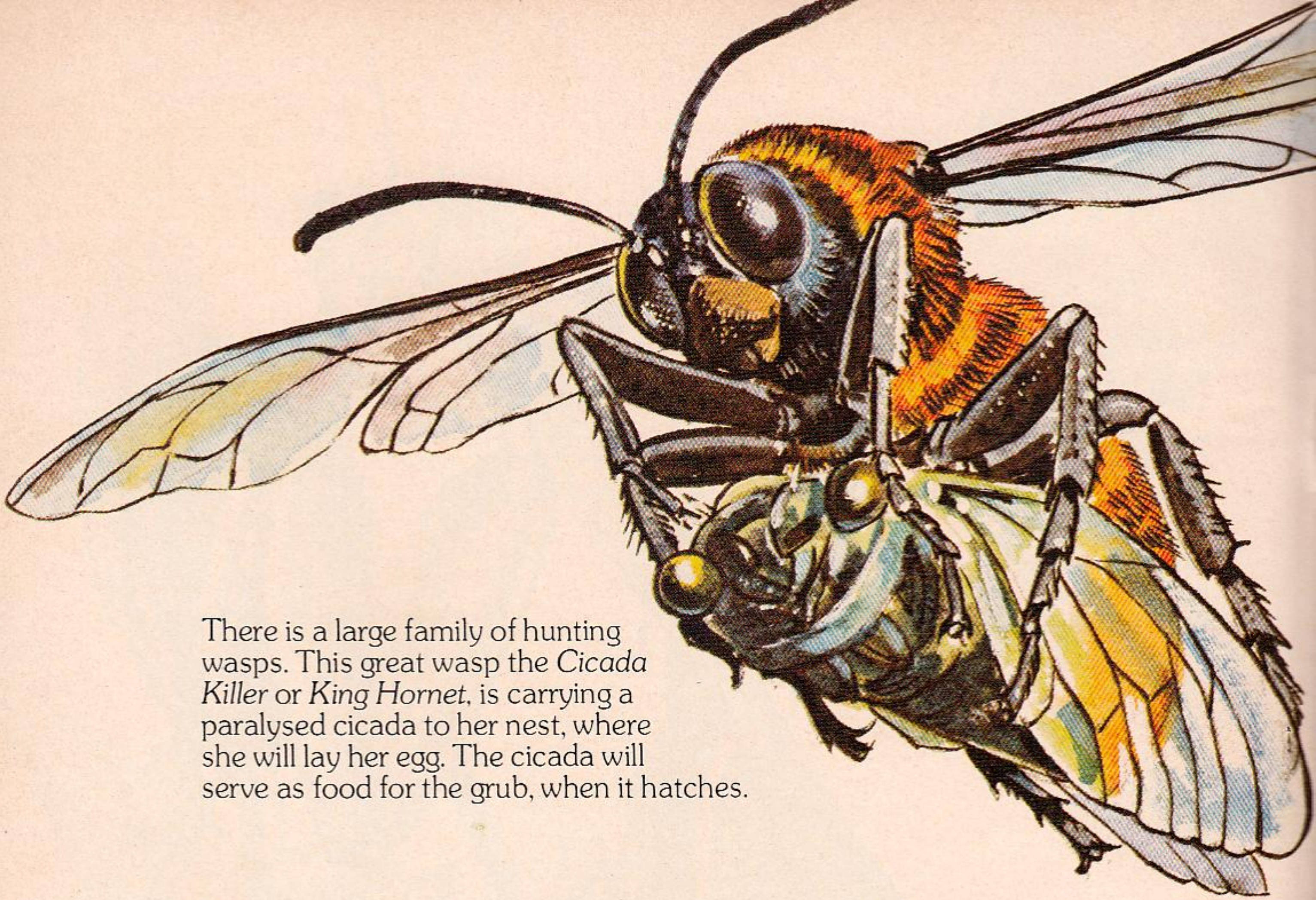


HUNTERS AND TRAPPERS:

Many insects live by preying on other insects. Some use their wings to pursue prey from the air, some have fast running legs, some make a trap and some just lie in wait, motionless until their prey are in striking distance.



The *Praying Mantis* has powerful pincer-like fore-legs which shoot out and seize any edible insect that ventures within range.

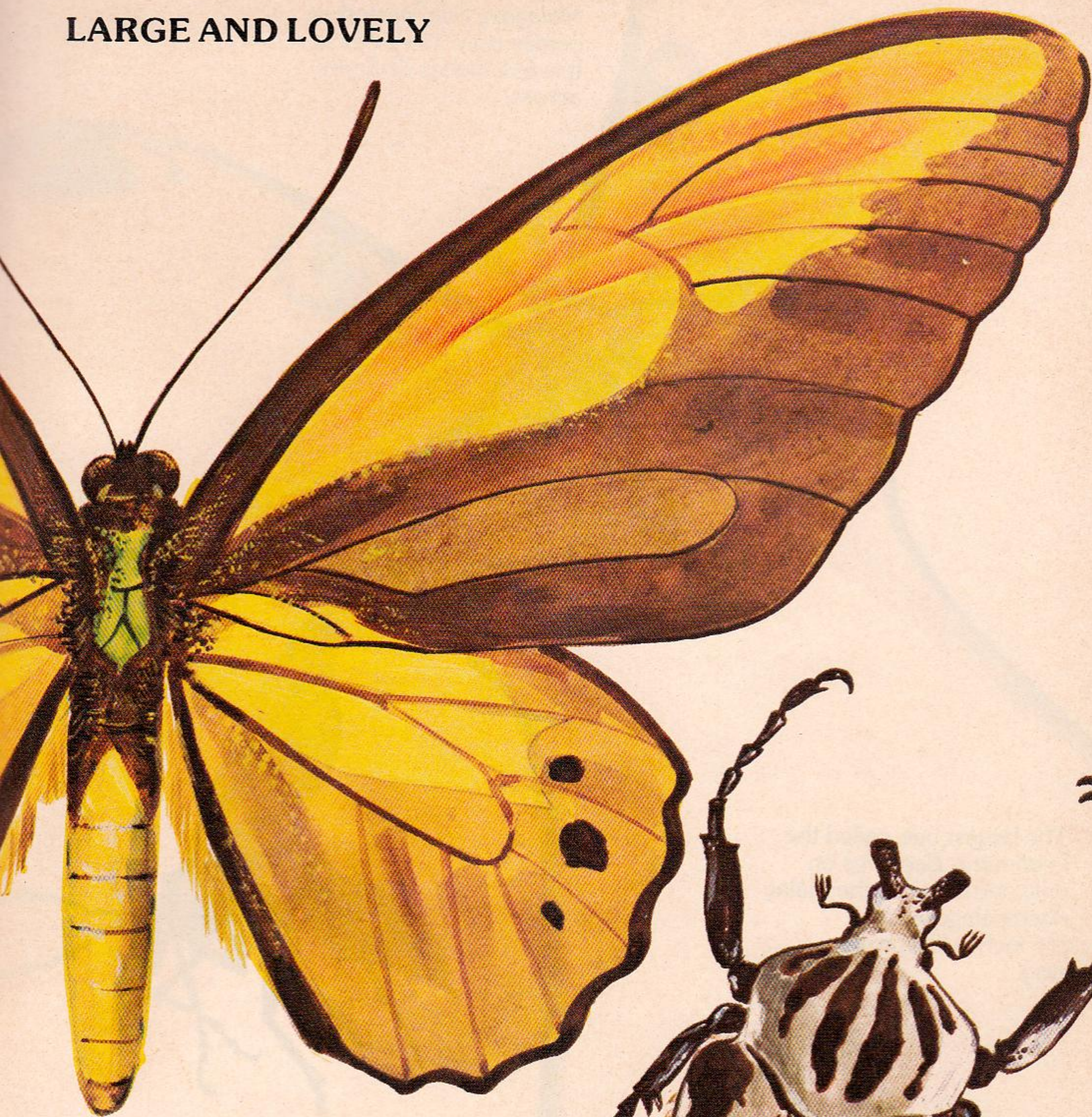


There is a large family of hunting wasps. This great wasp the *Cicada Killer* or *King Hornet*, is carrying a paralysed cicada to her nest, where she will lay her egg. The cicada will serve as food for the grub, when it hatches.



The monster at the bottom of the pit is the *Ant Lion* larvae. It digs a pit, and waits at the bottom for an unwary ant to slip over the edge. Then it seizes the ant with its curved jaws, and pulls it to the bottom.

LARGE AND LOVELY

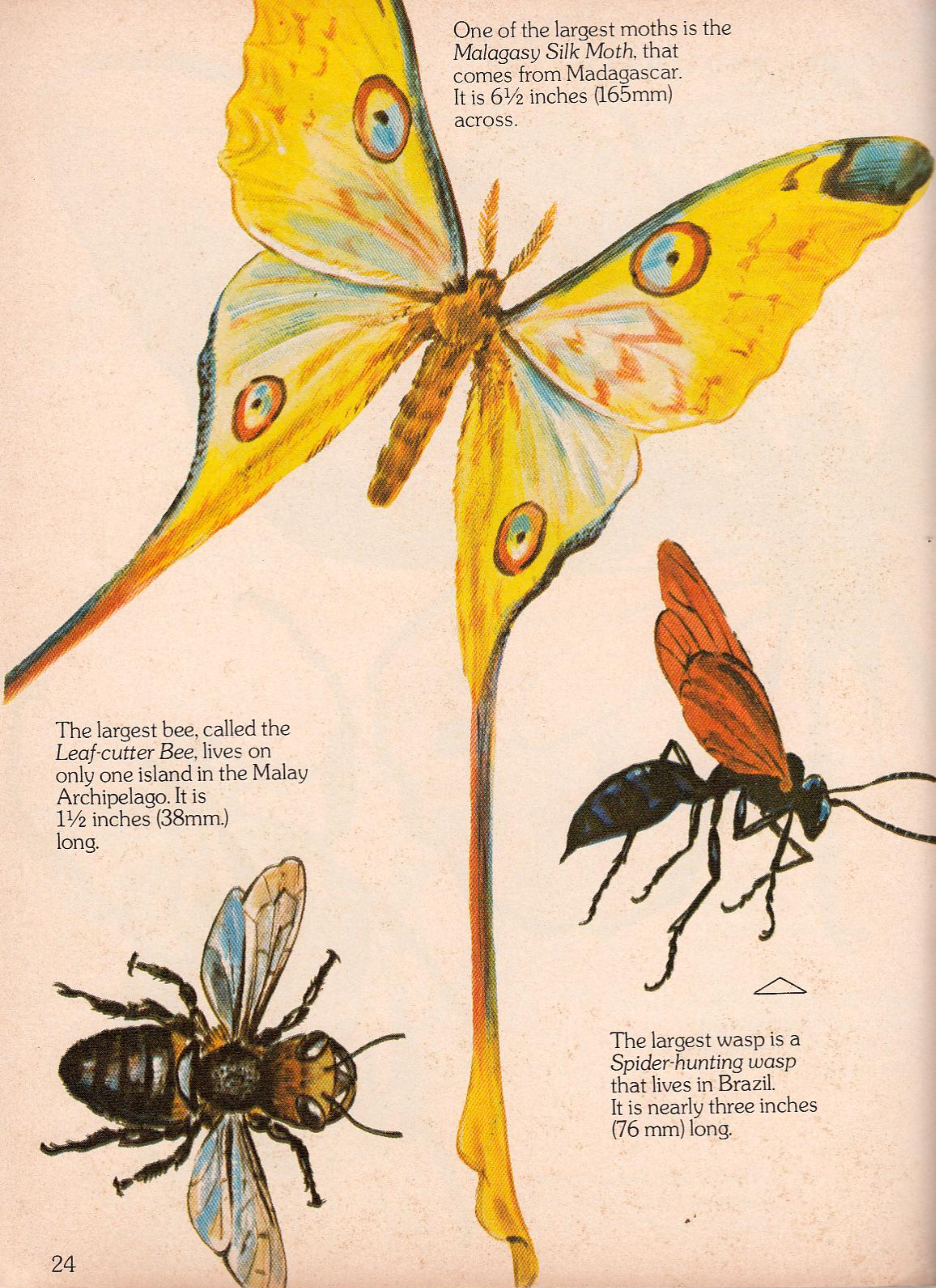


Some of the most lovely butterflies in the world are the giant *Bird Butterflies* found near New Guinea.



The *Goliath Beetle* is the heaviest beetle in the world, and comes from West Africa.

One of the largest moths is the *Malagasy Silk Moth*, that comes from Madagascar. It is 6½ inches (165mm) across.



The largest bee, called the *Leaf-cutter Bee*, lives on only one island in the Malay Archipelago. It is 1½ inches (38mm.) long.

The largest wasp is a *Spider-hunting wasp* that lives in Brazil. It is nearly three inches (76 mm) long.

titles in this series

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let's look at *FISH OF THE WORLD*

let's look at *HOMES*

let's look at *EARLY AUSTRALIA*

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let's look at *PETS*

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let's look at *SHELLS AND SHELLFISH*